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July, 1930 — 10 Cents

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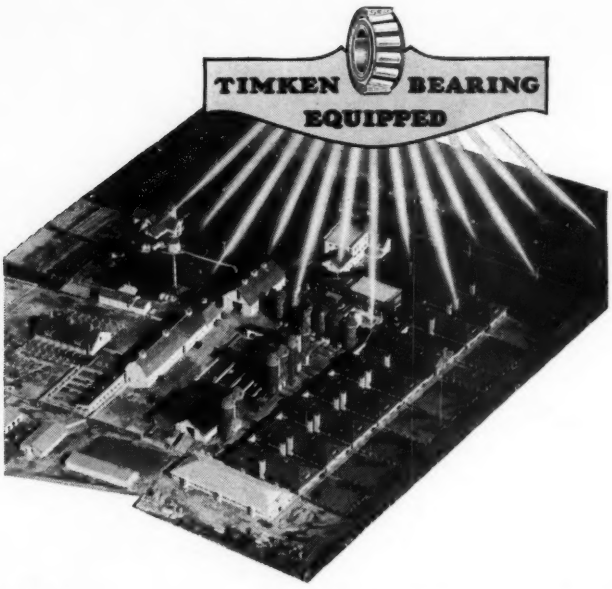


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# Better Crops with PLANT FOOD

The Whole Truth—Not Selected Truth

R. H. STINCHFIELD, *Managing Editor* SID NOBLE, *Editor*

*Editorial Offices:* 19 West 44th Street, New York

VOLUME XV NUMBER ONE

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IN THE COOL OF THE EVENING.

Better Crops with Plant Food

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**Like "The Brook" they go on forever**

# WEEDS

By Jeff McDermid

WEEDS are like the weather. There is more said about them than is done about them. Here and there some ambitious and energetic agriculturist tackles the problem of misplaced plant life with a temporary vengeance. He mingles such inflammable weapons as cuss words and sodium chlorate, or tries to smother them with more profanity and tar paper. He never stops to think that Agropyron repens and Cuscuta arvensis did not earn those names for nothing. He begins to have more respect for the so-called "dead languages" when he sees how very much alive the plants with Latin cognomens usually can be.

So we find in surveying the field of weeds that there are at least two kinds of them—widows' weeds and farmers' weeds. They are both mournful enough, I grant you, and both command due respect. The difference lies in the fact that the widow can get rid of hers faster than the farmer.

But the rains of July fall alike upon the just and the unjust, and it's only a question of how you hoe, and what and when and where. Some folks use the hoe as though they were digging post holes, and others scrape the tops off the lamb's quarters and purslane with a technique pleasant to behold. I take keen delight in

watching both schools perform, because I admire heroes even though their cause is lost. If perspiration were poisonous to weeds, there would not be very many left in some neighborhoods.

I always like to return to old Adam and original sources for a fresh viewpoint. It seems to me that he and Mrs. Eve faced a dilemma. They found a snake in Paradise and a riot of weeds when they got the gate. Then when Adam began his hopeless scrap with quack grass and bindweed he made himself some applejack—and lo and behold, he saw that snake again! Yet if I were choosing between snakes and weeds, I, too, would leave the Promised Land. The only trouble is that some of us have inherited both, along with boils and an amortized mortgage. You can doctor the boils, scotch the snakes (which means starve them), and dole off part of the mortgage, but the weeds go on forever.

IN the light of modern evidence, I am convinced that weeds and not blisters were the cause of Job's lamentations, that weeds drove the Hebrews through the Red Sea to Manhattan Island, and that they inspired Patrick Henry's oratory. I am also convinced that weeds discouraged the American Indians from becoming farmers, caused several Irish potato rebellions, and blasted the hopes of the farmer-labor party in 1924.

I am likewise persuaded that weeds held back the crop surplus and agricultural marketing act several decades, and maybe had some bearing on the failure of the debenture. Likewise I know positively that if it had not been for weeds we should have bathtubs and radio sets in every farm home.

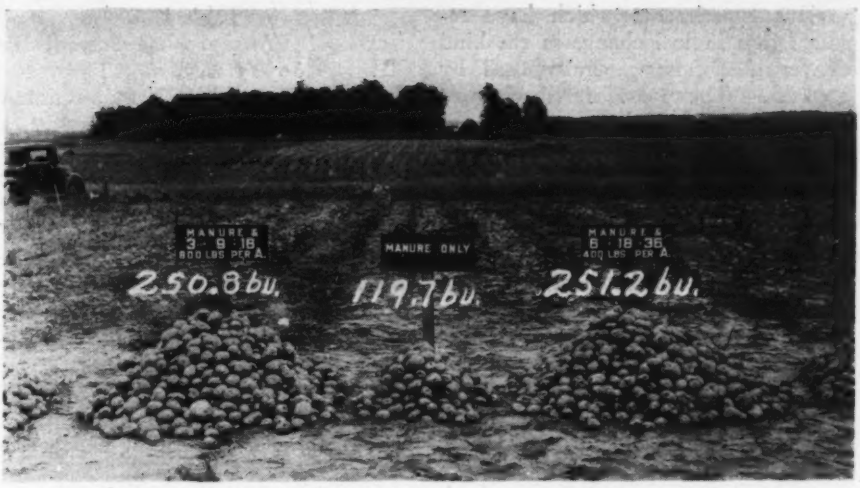
Lastly, if it wasn't for weed invasions many an extension worker would have to consult the research department for more new material. Thus you see that such humble examples of the marvels of photosynthesis and carbohydrate production can hog up a big share of the economic picture.

Strange to say, weeds always come from the adjoining farm. They are like measles and the itch—somebody always gets them before we do and is responsible for spreading them. The item of personal responsibility is not clung to in weed matters like personal liberty is with liquor rights. Blame the wind, the cows, stray birds, and your neighbor's cussedness, but never admit that you tested too late. Here, too, we inherit something from Adam and maybe a little from Eve. Human nature likes to admit its virtues and deny its discrepancies.

There be three officials upon whom public scorn is heaped, saith the litany. Number One is the Volstead sleuth, Number Two is the poundmaster, and Number Three is the weed commissioner. Those who keep us dry are in league with those who take up strays and fine us for not cutting thistles. Verily, the government is sticking its nose too deeply into the affairs of private citizens, says my bucolic friend. Inasmuch as weed commissioners are usually our neighbors, and neighbors dislike to be vehement and drastic about toadflax and corn cockle, the anti-weed campaign drags a dreary leg.

ONE of my county agent friends, bent upon solving this age-old barrier to weed scything, contrived to have his county weed inspectors nonresidents. This system, plus a carload of rough-on-rats in handy shakers, appears to have reduced the weeds to one ton an acre. I hope to have pictures of his plots in the next issue if I can get a tripod tall enough to reach above the wild sunflowers. He will go on the land in the spring with a spring-tooth and let it go fallow in the fall. Then he will sow hemp and

(*Turn to page* 61)




**A well balanced complete fertilizer supplementing manure, more than doubled the potato yield. Double strength fertilizer at half the quantity produced about the same as single strength.**

# Potato Profits

## *By F. L. Musbach*

Branch Experiment Station, Marshfield, Wis.

"WE certainly hesitated to make any change in the kind of fertilizer used until we were convinced that the recommendations had been proven out," said one of the large Langlade county potato growers in commenting on the results of plot tests conducted in that county. "But," he continued, "there is no longer any doubt that our soil responds to fertilizer with a higher potash content." Langlade county, it might be stated, represents a part of the newer potato-growing districts in the northeastern part of Wisconsin where commercial fertilizers are depended upon to assist in securing high acre yields.

Considerable advancement in the use of fertilizer had been made in this county because growers were alert and utilized all the best information available bearing on the subject of producing not only large, but profitable crops. Quite naturally Aroostook county, Maine, was referred to as a place where high yields were secured through the use of the right kinds and amounts of fertilizers. These eastern practices therefore, were responsible, in a measure at least, for the fertilizer program followed before the inauguration of the test plots.

Because of variations in soil, in climatic conditions, and in systems of farming engaged in, fertilizer plots were set up in Langlade county in 1926 in cooperation with County Agent J. Omernik and interested growers. Later the work was also taken up in Barron and Price counties where growers eagerly sought information based upon results secured under their particlar soil conditions.

It would consume more space than is available to go into detail of these

various experiments which have resulted in a radical change in the kind of fertilizer now generally used by growers. The 5-8-7 fertilizer used by 90 per cent of the growers in the Aroostook section was also the standard potato fertilizer in northern Wisconsin. While the 5-8-7 or mixtures of similar ratios have proven most profitable in the East, under Wisconsin conditions the fertilizer test plots told a different story.

Considerably less nitrogen is required on the one hand, and a higher proportion of potash, and also of phosphate, is indicated on the other hand. Such fertilizer mixtures as a 3-12-12, 3-10-10, 3-9-18, and 3-20-20 have proven much more satisfactory both from the point of yield and of quality.

### *The Climate Factor*

Undoubtedly the factor of climate is of importance, primarily, as concerns the nitrogen requirement in the two areas. In this connection it might be of interest to compare the temperature and rainfall conditions of Antigo, Wisconson, with those of Presque Isle, Maine, as indicated in the following table:

Table I

| | Antigo 36 Yr. Av. | | Presque Isle 11 Yr. Av. | |
|---|---|---|---|---|
| | Temp. | Rainfall | Temp. | Rainfall |
| May | 53.9 | 3.78 | 49.4 | 2.76 |
| June | 63.9 | 4.35 | 58.7 | 3.95 |
| July | 67.9 | 4.29 | 65.9 | 3.10 |
| Aug. | 64.9 | 3.20 | 63.2 | 3.59 |
| Sept. | 57.8 | 3.51 | 54.9 | 2.97 |

The temperature difference is quite marked especially during the early growing season. The warmer, moister months in northern Wisconsin are apparently responsible, in a degree, for the lessened response to the fertilizer relatively high in nitrogen. Then, too, the system of farming engaged in affects fertilizer response. Wisconsin growers under diversified farming practices have manure available, usualy applied on sod land in fairly liberal amounts.

While manure may be considered a potash fertilizer, yet the amount available for the potato crop is insufficient for maximum yields. In connection with the response to various fertilizer formulae the results obtained in 1930 in three different sections may be of interest. Table II

(*Turn to page 57*)

# Pastures for the South

*By E. B. Ferris*

Jackson, Miss.

ONE of the handicaps to successful farming in the United States, and especially in the South, is the effort to cultivate too much land. We have this land and have known nothing else than to work it in the common farm crops. A valuable lesson might be learned from the German who came to this country and bought 20 acres of land. When asked if he thought he could make a living on it, he replied that if he could not, he would sell half of it, as he was sure he could live comfortably on 10.

It is well enough to own wide acres if each carries its own burden of taxes and interest on invested capital, but there are few farms here where the best acres do not have to carry the burden of as many, or more, unproductive ones. The trouble is, we depend too largely on cultivated crops to return the income, forgetting that lands too hilly or too poorly drained to be cultivated with safety might be profitably utilized for grazing or the growing of timber.

Years ago the students of a class in agriculture at the Mississippi A. & M. College were taken to the farm of a pioneer dairyman and cattle breeder near-by, that he might give to them the accumulated experiences of his many years of work and thought. The advice given by this far-seeing man, who has since come to be looked upon as one of the wisest of his generation, was that we should encourage the growing of grass and the introduction of improved livestock. In fact, he was of the opinion that we should throw away the tools for killing grass, keeping only those that might be used to make it grow more luxuriantly.

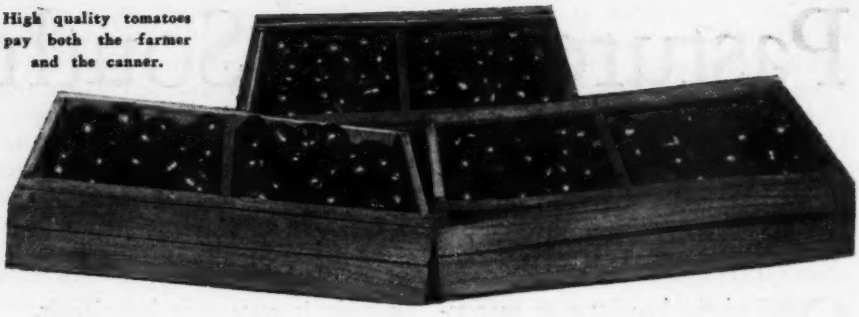
It has taken almost half a century for his neighbors to fully appreciate his wisdom, and the fact that his advice was sound is evidenced by the history in recent years of the section where he lived and to which it was supposed to apply. It is now the banner cattle country of an entire State; in fact, of all States that adjoin it, and has reached this point without materially reducing the crops that then were grown almost exclusively, cotton and corn.

Not all the lands in this one State or adjoining ones are so well suited to the growing of grasses and clovers, but many of them are, and we could mention counties by the dozen in Mississippi and its boundary States that might do fully as well if the landowners were only impregnated with the ideas that this wise old gentleman so successfully sold to the people of Oktibbebha county.

Being cotton-minded, we have attached too little importance to other crops often better suited to our peculiar soil and climatic conditions. Almost daily we see being cultivated lands that any reasonable man might know could never be expected to produce the crops being grown at a profit. These same lands, if plowed and sodded to grasses and clovers, would at least remain where they are, rather than be washed to places below, and with a little help in the way of added plant food, might soon become the best revenue producers of the farm.

Almost as often, we see good stands of young timber being destroyed to

(*Turn to page 56*)



High quality tomatoes pay both the farmer and the canner.

# Graded Tomatoes

*By F. C. Gaylord*

Purdue Agricultural Experiment Station

THE Ten Ton Plus Tomato Club pointed the way to high yields per acre, but the working-out of a method whereby the grower is paid for the tomatoes delivered on the basis of a definite standard of quality places the growing of tomatoes for the cannery upon a sound, equitable, and more profitable basis. At last an incentive in more dollars per ton is placed squarely before the grower. The use of better soil, more liberal applications of commercial fertilizer, and better cultural methods are paid for by higher yield, and what is even more important, higher prices per ton.

The results of buying tomatoes for canning factory use have been so satisfactory both to growers and canners that in the short space of three years the system has grown from a system without a following, until during the 1930 canning season 40 Indiana factories will buy their product solely upon the basis of U. S. Grades. Likewise the entire canning tomato area of the United States is either trying out the system or is interested in it.

In 1927 when the investigations were begun in the Hoosier State to determine if the proposed U. S. Grades could be worked out and a satisfactory mechanical system developed, practically every canner in the State felt that it would never work. However, the investigations concerning the quality of tomatoes being received by the old flat rate method were so startling and conclusive that when the first year's work was published, 10 canners agreed to try the new-fangled system during the 1928 season. Most of them felt that it might help; it couldn't be much worse.

The results have been so gratifying to canners and farmers that a limit of the number that could be handled in 1930 has kept the number "buying on the grade" down to 40, which was the upper limit set for 1930. Among the factories using the system will be found every size from the smallest to the largest.

In 1927, 3,265 tons of tomatoes were examined at 13 different factory districts in Indiana in order to learn something about the quality of the raw product being received under the flat rate system. From these grad-

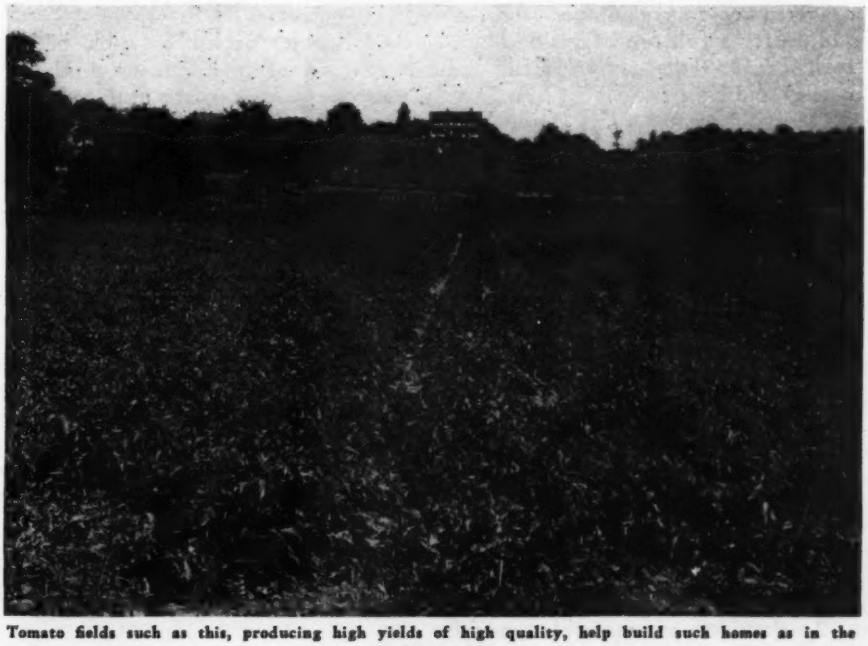
ing operations it was found that Indiana canning crop tomatoes were running about 30 per cent No. 1's, 50 per cent No. 2's, and 19 per cent culls. When the facts in regard to the quality of Indiana tomatoes were placed before the canners, 10 factories agreed to contract their acreage on the basis of the U. S. grades as interpreted in Indiana in 1927. Special contracts calling for a definite price for No. 1's and No. 2's, with no pay for culls, were signed between the grower and the canner at these factories.

### *More No. 1's*

During the 1928 season, 8,234 tons of tomatoes from 1,103 growers were received. The seasonal average for all tomatoes delivered was 47.19 per cent No. 1's, 47.42 per cent No. 2's, and 5.39 per cent culls. In 1927 under similar conditions on the flat rate basis, the averages were 30.4 per cent No. 1's, 50.6 per cent No. 2's, and 19 per cent culls. A comparison of the results of factories buying on a graded basis in 1927 and 1928 show that they averaged 16.8 per cent No. 1's with 13.6 per cent less culls in 1928.

In comparing the results of the three years 1927, 1928, and 1929, it is found that as a result of this system, the growers delivered in 1927, 30.4 per cent No. 1's as compared with 47.19 per cent in 1928 and 51 per cent in 1929. They reduced their culls from 19 per cent in 1927 to 5.39 per cent in 1928 and 3.19 per cent in 1929. In the three years of investigation, two of which were done under actual buying and selling of tomatoes under grade contract, the growers have almost doubled their percentage of No. 1's and practically eliminated the green and rotten tomatoes. At two factories where approximately 2,000 tons of tomatoes were received, the average percentage of culls for the entire season was a little over one-half of one per cent.

In cooperation with Dr. John H. MacGillivray of the Purdue Agricul-



**Tomato fields such as this, producing high yields of high quality, help build such homes as in the background.**

tural Experiment Station, color determinations were made on the No. 1's, 2's, and culls as graded in 1929. In every instance the results showed that the best color was obtained in No. 1 tomatoes and the poorest color in the culls. Under commercial investigation, as well as in the laboratory, the percentage of dry matter was highest in the U. S. No. 1 grade, and correspondingly lower in the culls which were not accepted. Results secured in 1929 definitely show that not only does grading improve the quality but likewise increases the quality of manufactured tomatoes and tomato products that can be secured from a ton of product.

A comparison of the cost of buying on the grade versus the flat rate shows that in 1927 at the factories under investigation the raw product on a $13.00 flat rate cost $16.05 per ton of usable tomatoes. If these tomatoes had been bought on the grade at $10 and $18 tomatoes they were worth $10.18, or $13.33 for a full ton. In 1928 the cost of a full ton on the $13 flat rate was $13.74 per ton. On the basis of $10 and $18 the tomatoes as delivered cost $13.26 per ton, or $14.01 for a full ton of usable tomatoes. In 1929 the cost of a full ton if they had been bought on a flat rate of $13.00 was $13.40. On the basis of $10 and $18 they cost $13.76 per ton as delivered, or $14.18 for a full ton of usable tomatoes. These figures show that the farmer is getting more money because he is delivering better tomatoes, and the canning factory is buying its tomatoes cheaper than it did on the old flat-rate basis.

### *Many Advantages*

The results of three years' investigations show that the graded system of buying tomatoes has many advantages, a few of which may be listed:

1. It's an effective, simple, economical, mechanical method of buying and selling. The cost need not exceed 25 cents per ton.

2. Provides an equitable or fair basis for buying since every grower gets paid for his tomatoes on the basis of the quality he delivers.

3. Enables packer to buy more economically since he contracts to buy a given known quality of product at definite prices.

4. Eliminates culls—green and rotten tomatoes. Three years' results have reduced the culls received from 19 per cent to 3½ per cent.

5. Insures higher percentage of real red-ripe tomatoes. No. 1's have been increased from 30 to 51 per cent for the season average.

6. Enables packer to classify growers and eliminate or educate the poor ones. Many of the poor growers have taken a new interest in tomato growing and have delivered better tomatoes on grade.

7. Enables canner to attract better farmers not interested under the flat rate. Many farmers that were not interested in growing on the flat rate have joined the ranks of quality growers.

8. Cuts down manufacturing cost. Less bad tomatoes to pull out, so can operate at a more rapid rate with better tomatoes.

9. Enables packer to pack higher proportion of high quality products. Since they have more real red-ripe, sound tomatoes the percentage of high-grade pack is increased.

10. Gives packer basis for determining efficiency of manufacturing operations and enables him to check up on factory management.

11. Enables packer to maintain standard or quality year after year. The grades are the same year after year, so they can maintain a given standard.

12. Eliminates worry and trouble of buying raw stock. The inspector grades the tomatoes received and furnishes certificate of grade used in buying load.

13. Places buying of raw stock on definite known standards with neutral, disinterested federal-state inspectors.

(*Turn to page 55*)

# *The* Inquiring Mind *and the* Seeing Eye

*By Dr. A. S Alexander*

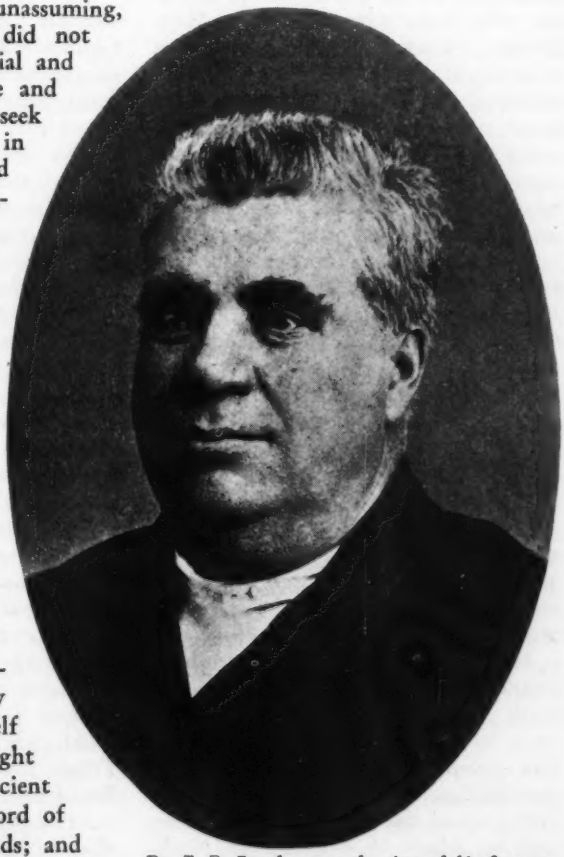
University of Wisconsin

> Statesman, yet friend of truth! Of soul sincere;
> In action faithful, and in honor clear;
> Who broke no promise, served no private end;
> Who gained no title, and who lost no friend.
>
> Pope.

IT was Dr. Edwin Rowland Boardman's request, in life, that his tombstone should not cost over $50; yet he richly deserved a noble monument, for he was considered the wisest man in Stark county, Illinois, and was esteemed and loved by everyone in his home district.

He was so modest and unassuming, however, that his fame did not spread among the influential and noted people of the State and Nation. He did not seek notoriety or applause, but in a quiet way accomplished wonders, mastered the sciences in which he was interested, contributed a wealth of information regarding insects and plants, yet found time for efficient service as a country doctor of the old school and the able administration of many estates and out-of-court adjudication of various local disputes.

He lived and died a comparatively poor man, who did not crave wealth, was too busy to accumulate it, but unquestionably laid up treasures for himself in heaven. Of him it might truly be said, with the ancient writer Wotton, "he was lord of himself, though not of lands; and having nothing, yet had all."



Dr. E. R. Boardman at the time of his first acquaintance with the author, in 1882.

Dr. Boardman was born March 3, 1829, in Luzerne county, Pennsylvania, and at the age of 11 years was taken to Illinois by his parents. After a weary journey of 40 days they arrived at Paw Paw Grove where Shabbona and his friendly tribe of Indians lived. At the age of 16 he began the study of medicine, under the tutelage of Dr. G. S. Hunt, and later studied at the LaPorte, Indiana, Medical College. There were no railroads in those days, therefore, he walked to and from college.

In 1849 he began practice and had a hard struggle before he succeeded and became popular. His entire earnings the first year amounted to but $25.00. In September, 1850, he married Hannah Fuller, of the ninth generation of the Fuller family ancestor who came overseas in the *Mayflower*. They started housekeeping without a cent, in a two-room cabin which the neighbors helped them to build, and in it they used blocks of wood for chairs. Five sons and five daughters were born to them, of whom George D. Boardman, Neponset, Illinois, and a sister survive.

Their home was on a 120-acre farm which originally was timberland, bought 40 acres at a time, and laboriously grubbed and cleared for farming.

Dr. Boardman early became a student of nature, taking up the study of botany before he began the practice of medicine. He walked over the then wild State of Michigan collecting a great herbarium, which later was destroyed by accident. About the year 1868 he became interested in entomology and pursued its study arduously all of his life.

During the Civil War he rendered eminent service as a physician. He made no charges for medical attendance upon soldiers or their families and ministered to the sick and wounded at Palmyra, Missouri, to the survivors of the battle of Stone River, and to others in hospitals at Nashville, Tennessee. His home was ever open to sick and wounded soldiers and many were there nursed back to life and health.

### *A Happy Religion*

His strenuous life came to a sudden and untimely end, from heart failure, on Saturday, July 25, 1891, at his home in Elmira, Illinois.

After his death his great collections of insects, plants, and woods were donated by his widow to the Toulon, Illinois Academy. Later the Academy burned down and the collections were lost. What a tragedy it is that the results of his lifetime's labors were not preserved in the museum of some great Illinois institution of learning for the education and inspiration of young people.

Dr. Boardman was a constituent member of the Osceola Baptist Church. There was daily family worship in his home. The workers on the farm were welcome and there never was a time when some poor, homeless person was not a guest. His son, George, told me that the church contribution and wages for the hired help were laid aside each Saturday evening, and if any money remained it was used to buy things needed for the house; otherwise, they went without.

The good physician was a friend to rich and poor alike, if worthy, and everyone gave him a kindly greeting as he drove about in his buckboard behind the Indian ponies he loved, or walked abroad accompanied by his faithful dog. His was a happy religion. His smile captivated and his wit and humor made his converse the more enjoyable.

The old homestead was sold by a daughter to Mr. Noah Winn. The remaining son, George, lives on the adjoining farm, known as the Uncle Johnny Turnbull place.

At the funeral services, Rev. Frank Ross, of Elmira, said of Dr. Boardman:

"His was such a restful personality that in his presence one felt as does a weary one who sits down in the shade

**The Boardman Home near Elmira, Ill., in the early eighties.**

of a great tree; and he was as unassuming, as self-reliant, as steadfast, and as beneficent in his influence as the great, spreading tree."

* * *

It was in the latter part of May, 1882, that I became acquainted with the subject of this sketch. I had just come to America from Scotland, and, on the way to Iowa, stopped at Kewaunee, Illinois, to visit Uncle Johnny Rule on his farm near that town. When that prosperous Scot learned that I was what he termed a "bugologist" he told me that their local physician, Dr. E. R. Boardman, was a noted naturalist and remarkable personality whom I should visit.

"Don't expect to meet a swell, dressed-up highbrow," said Uncle Johnny, as he mounted me on one of his bucking bronchos and pointed the way to the naturalist's place near Elmira. "He's just a plain, practical fellow," he added, "but a great man all the same, wi' a wonderfu' brain. *He'll do you a lot of good!*"

The description of the doctor and the estimate of his character were correct in every particular, and he not only "did me a lot of good," but proved an inspiration, the influence of which has lasted through life.

The rugged, genial doctor appeared a very giant as he advanced and gave me a cordial welcome. From under shaggy eyebrows sparkled the keenest eyes I had ever seen, and when he spoke, each word was perfectly intoned and instantly impressed its meaning. One immediately decided that here was wisdom personified. Later, as I sat with him in his plainly furnished study and listened to his discourse on flowers, trees, and insects, his presence seemed indeed like the shadow of a great rock in a thirsty land. He was the most restful, clear, convincing, and appealing talker I had ever heard, fresh as I was from the lecture halls of Scottish institutions of learning. Yet he made no attempt to lecture. He simply poured out the facts and thoughts which filled that wondrous brain of his and welled from a heart overflowing with love for God's marvelous creations.

Around the walls of the study and office were cabinets formed of tier upon tier of shallow drawers, and as we talked of beetles and butterflies, one after another of them was drawn

out and exposed thousands upon thousands of finely mounted insects. The butterflies and moths included magnificent specimens from different parts of the Globe, as well as those known to Illinois and the surrounding States. They were beautifully preserved, without damage to their microscopic "feathers and bloom." In those drawers I saw for the first time sections of naphthalin used to prevent moth attacks.

### *We Go Beetle Hunting*

While the doctor exhibited the flowers in his immense herbarium, I learned, incidentally, that he had studied the Scandinavian languages, that he might correspond with the naturalists of Europe, and I have no doubt he had as good a working knowledge of other foreign languages. He mastered the subjects he studied, perfectly organized his facts, and stowed them away in the brain cells of a most marvelous memory.

I soon discovered that he could instantly classify and give the Latin name of every plant and insect he possessed, and was astounded to note the dexterous way in which he handled his specimens and the neat manner in which they had been mounted and preserved. One scarcely would have expected such expertness from a man of Dr. Boardman's colossal build and seemingly phlegmatic temperament; yet, I saw him use his hands as deftly as those of an artist and net butterflies as quickly and surely as might a young athlete.

For hours I sat entranced as we examined his treasures and he gave me practical instructions in the various mysteries of the naturalist's art. When plants and insects had been studied and admired, a complete collection of woods was exhibited, every specimen of which the doctor personally had obtained and prepared. Side by side lay split stems of various native trees, each three inches in diameter and five inches in length. On one side of each specimen was the natural bark, with the inner surface of the wood of one piece beautifully polished, and the other showing the grain in its natural condition. The collection contained a specimen of every tree indigenous to Illinois and many from surrounding States.

The next day Dr. Boardman showed me thriving specimens of live trees planted with his own hands in an orchard nursery and ravine of some 10 acres near the farm house. To the doctor's dictation I listed, with their common and Latin names, 58 different trees native to Illinois, and I have the list today. The ravine was a lovely, quiet, shady spot. I can remember now the sweet scents wafted by the summer breeze from the white pine, red pine, balsam, fir, red cedar, and larch trees clustered near the entrance. I wonder how many of those trees have survived? Some day I purpose going down there to see; but I have been told that the old orchard and nursery are no more.

The day after our chat in the library, Dr. Boardman furnished me with a Mason jar containing a few lumps of potassium cyanide covered with absorbent cotton and blotting paper, as a "killing bottle," and took me beetle hunting along an old rail fence and through the woods and fields. Space will not permit me to recount the wonders of nature he imparted. He was the first to tell me about the ants and their aphid "dairy cows"; to explain how a spider knows, by *feeling*, when a fly is caught in its net; how a 17-year locust (cicada) plays his kettle drums; and how the grasshopper and cricket contribute their notes to the insect orchestration.

As he moistened a finger tip, to pick up a tiny insect, Dr. Boardman said:

"Mind now! The smallest things in nature are sometimes the most important. None must be overlooked. Don't be unduly attracted by the prettily colored, great, and gaudy

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*Experimental Study Proves That—*

# Early Plowing Gets the Weeds

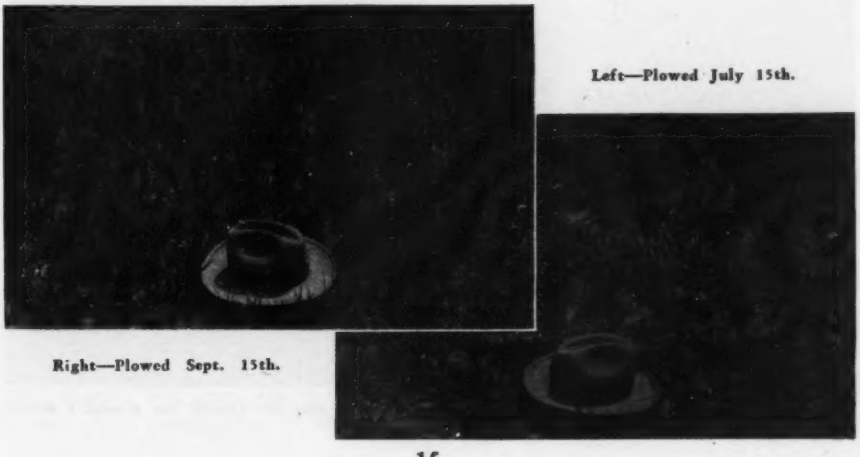
*By W. A. Albrecht*

University of Missouri

SO much has been said for the value of early plowing as a means of improving the wheat crop that we have not appreciated some of the other benefits attendant upon this phase of early seedbed preparation. Killing weeds, or keeping the land from getting foul, is an important advantage of early plowing.

At the Missouri Experiment Station, where a study was made regarding the influence of early plowing on the nitrate content of the soil, the wheat plot plowed in late July or early August left a stubble almost free of weeds, while that plowed in September was badly infested. This infestation consisted mainly of the bracted plantain at the time of harvest, but increased by other weed varieties, including crab grass, ragweeds, and others. The early plowing turned under the light weed crop, while the delay in plowing left the heavier infestation to go to seed. Plowing in September was then merely a method of replanting the same crop of weeds whose seeds matured in consequence of the delayed plowing date.

It has often been argued that delayed plowing produces this larger weed crop to be turned under as green manure and therefore ought to benefit



Left—Plowed July 15th.

Right—Plowed Sept. 15th.

Early plowing makes better wheat. Plowed July 15th.

the succeeding wheat crop. The fallacy of such reasoning is evident from the fact that the excessive weed growth dries the soil and reduces its supply of soluble nitrogen, both to the detriment of the subsequent wheat.

This reduction of nitrates is of marked significance. The weeds not only reduce the nitrates in the soil before they are plowed under, but also, as a highly carbonacious matter, they hold down the nitrate accumulation after plowing. According to the Missouri results, the nitrate content of the soil in the late plowing was only 1/2 to 2/3 of that in land plowed in July.

The weeds are a big factor in disturbing the soil processes producing nitrates. Instead of allowing the soil to accumulate nitrate, they convert the already low supply of soluble nitrogen into the insoluble form beyond the reach of the wheat crop. Removing the weeds as a nitrate disturbing factor is proving as important an effect as tilling the soil to save its moisture or to establish a firm seedbed.

Early plowing for wheat is a wise practice in that it pays double dividends, one in the form of more wheat and the other in the form of less weeds. So far as the weeds are concerned, it is a prevention, and consequently recognized as worth many times more than the cure.

This wheat was treated the same as the above wheat, except that the ground was plowed 2 months later.

# Complete Fertilizers for Apple Trees

*By Fred W. Hof Mann*

Virginia Agricultural Experiment Station

ON the whole, it is not difficult to show more pronounced and outstanding growth and yield responses in apple trees when nitrogen fertilizers alone are applied to Virginia soils than when phosphatic and potassic fertilizers are also added. Marked responses do not show up with phosphatic and potassic applications. It is quite natural, then, that nitrogen applications by themselves are considered the more important in Virginia for the growing of apples. In the light of some recent experimental evidence acquired at the Virginia Agricultural Experiment Station, we should not, however, altogether ignore the value of phosphatic and potassic materials supplementing nitrogen fertilizers.

The value of all of these materials applied to Virginia soils for apple growing seems to show up with the increasing age of the trees. It is very likely that with the increasing needs of the apple tree certain deficiencies in the soil are liable to develop and that the chances of growth and yield declines could be offset sooner and more effectively with certain applications of fertilizers containing all three of these essential plant food elements.

It should be reasonable to ask whether it would be more advisable to wait until phosphatic and potassic deficiencies actually manifest themselves or would it be safer to take no chances at all against any possible malnutritional effects, but from the very outset and right along keep all three of these essential elements amply provided. At any rate nitrogen applications supplemented in reasonable amounts with phosphatic and potassic fertilizers will do no harm outside of the expense involved. Furthermore such applications should be valuable to provide an ample reserve for the possible increasing needs of the apple tree.

The applications of phosphatic and potassic material along with nitrogen even in the earlier period of the apple tree may be of great value ultimately. It may, therefore, be more profitable in the end to apply fertilizers containing all three elements from the very outset even if no need is clearly apparent.

Most of our apple soils in Virginia show adequate amounts of available phosphatic and potassic materials to produce profitable crops for some time. The amounts of these materials may continue to increase with further disintegration of soil and rock particles. To what extent such additions may be offset by mechanical and chemical fixation is hardly clear. Neither is it settled just how long average growths and yields for apple trees will be maintained without the addition of the necessary plant nutrients and how close the limit may be approached without the danger of allowing growths and yields to be impaired.

In most Virginia orchards it is quite likely that in time the soil will be so occupied by the roots of the apple

trees that it will be completely root bound. The chances for such root binding is relatively greater in Virginia with its heavy clay subsoil. The roots of apple trees can hardly penetrate these stiff sticky areas, with the result that exploitations for food materials are confined to relatively shallow limits.

Very little available fertility will be left in such soils to maintain vigorous growths and high yields. Very likely such apple trees will be more appreciably benefitted with proper applications of nitrogen fertilizers supplemented with phosphorus and potash. Although the possibility of lowered fertility of all three elements in these soils may be presumed and explained upon this basis, just when and to what extent deficiency occurs is still under considerable conjecture. These points can perhaps be best answered from observations based upon trial and error procedure. Observations in such trials with other crops have led to some convincing conclusions.

### *Complete Fertilizer Best*

Definite increase responses with such crops as corn and timothy have shown up when nitrogen is supplemented with phosphatic and potassic applications. In a 10-year experiment at this station with corn, a continued application of 333 pounds of dried blood per acre gave a yield of 24.37 bushels per acre, while applications of 333 pounds of dried blood, 438 pounds of 16 per cent superphosphate, and 200 pounds of muriate of potash per acre gave a yield of 53.87 bushels.

In a 10-year experiment with timothy carried on by the Ohio Agricultural Experiment Station and the United States Department of Agriculture, the results of the increases of several fertilizer applications are shown. These results are brought out in Table 1. An increase of 1,306 pounds of dry hay per acre was produced when 120 pounds of sodium nitrate, 240 pounds of 16 per cent superphosphate, and 80 pounds of potash to the acre were used as against a 793 pound increase for 120 pounds of sodium nitrate to the acre and a 891 pound gain when 5 tons of farm manure to the acre were applied.

These trial and error results with such crops as corn and timothy as well as those of other crops should be of value in indicating the possible ultimate response of apple trees when they likewise are treated with all three elements. Since apple trees have root systems capable of extending into much larger soil areas, a longer period will be necessary to show the results of these applications. Where timothy and corn may show the benefits of nitrogen, phosphorus, and potash treatments in some 10 years, a longer period very likely will be necessary for apple trees.

Experiments with apples carried on by the Virginia Agricultural Experiment Station since 1911 to study the role of fertilizers and moisture in tree growth and fruit bud formation indicate some interesting responses where nitrogen applications have been supplemented with either or both phosphorus and potash. These results are brought out in Tables 2, 3, 4, 5, 6, and 7.

Although nitrogen applications by themselves show the pronounced and outstanding gains as compared to the non-treated plats, the highest yields and gains generally prevail when either phosphorus or potash or when both have been applied with nitrogen. When yields for the same year and treatment were averaged from several experimental orchards of New York, Pennsylvania, West Virginia, and Virginia and differences secured for each of these years, conclusive responses in growth and yield show up in favor of some combination of nitrogen with either phosphorus or potash or with both. The combinations supplementing nitrogen show the higher responses.

On the whole, from the results that have been secured through this Sta-

**The clean cultivated experimental apple orchard of the Virginia Agricultural Experiment Station at Blacksburg in the spring of 1930.**

tion, a complete fertilizer combination of nitrogen, phosphorus, and potash is the better application to use in most Virginia apple orchards for higher yields.

Just to what extent supplemental applications of phosphatic and potassic material pay in Virginia apple orchard management depends upon the prevailing cost of these elements where the expense of fertilizers alone is considered as against the price that can be received for apples. The value of taking precautions against possible decline in growth and yields by keeping an ample reserve of all three essential elements provided is not so easy to determine. Trial and error observations of much longer duration will very likely have to be maintained to help determine this value.

Just what the amounts and proportions of these three elements should be for the most economical responses in apple yields also is still to be solved. In the solution of this problem, statistical analysis of trial and error observations for some time will very likely continue to be the more reliable method. Nevertheless, as a guide or basis for application, the amounts and proportions of these three essential food elements found in the different parts of the apple tree and its fruit need not be discarded altogether. At least, it is certain that these elements are present in the apple tree and its fruit even when no applications have been made.

It is obvious that these elements are removed from the soil and although they may be found to vary in their amounts and proportions with diferent kinds of fertilizer applications, independent analyses show them to be present in not greatly varying proportions. Furthermore, control experiments show conclusively that all three elements must be present to maintain growth in apple trees.

### *Chemical Analyses*

The amounts and proportion of these three elements found in chemical analysis, may not be just exactly the correct amounts and proportion to apply to the soil for the greater growth and yield gains. Nevertheless, such analysis indicates what has been removed and serves in measure to show what may be restored to maintain the original fertility or perhaps even to enhance it. These chemical analyses may, therefore, have some limited value in measuring fertilizer application in so far as nitrogen, phosphorus, and potash are concerned.

R. C. Thompson in the Arkansas Agricultural Experiment Station Bul-

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# Why, Sweet Clover?

*By L. R. Combs*

Iowa State College

KNEE deep in sweet clover at the time of the wheat harvest is the song western Iowa farmers will soon be singing. In the past few years western Iowa farmers have turned to sweet clover as the choice of clovers, grasses, and alfalfa. They have not done this because they could not get stands of alfalfa or other clovers, but because they have found in sweet clover an almost universal answer to their particular needs, just as farmers in certain other sections of Iowa, Kansas and surrounding states have found sweet clover a very valuable crop.

In the Missouri river bottoms and in the hilly sections along the Missouri and Big Sioux, farmers have developed their own methods of sweet clover production. Many of these practices have been based on recommendations of the Iowa State College, while others have been learned in the school of 15 years' experience.

These farmers have found that sweet clover makes a heavy growth which, when plowed under, is a valuable green manure crop. It makes valuable late summer and fall pasture after the wheat or oats are off the ground. When not used as pasture, a hay crop of one to two and one-half

**A harvesting scene on a western Iowa farm. Note the height of the sweet clover on the front wheels of the tractor and the relative height of the wheat in the background. The man on the binder is P. J. Quist, owner of the farm, while J. A. Price is standing up in the center of the picture and R. L. Quist is operating the tractor.**

Knee deep in clover at wheat harvesting time. Note the height of the wheat. The men from left to right: R. L. Quist, P. J. Quist (owner of the farm near Missouri Valley), and J. A. Price.

tons may be harvested in late September. In reclaiming waste or run-down soils, sweet clover has few equals. And last but not least, the cost of seed is relatively low.

Fifteen years ago a trip through this section would have revealed about 15 or 20 acres of alfalfa to every one acre of sweet clover. In fact the latter was regarded as a weed; the exponents of it as a soil builder and pasture in many cases gathered their seed along the roadside. Now the reverse is true. Alfalfa is still a popular crop, but the acreage of sweet clover in some areas in western Iowa will surpass the alfalfa acreage thirty to one. Interest in sweet clover has brought the total clover acreage to about equal alfalfa acreage in Iowa as a whole.

Nor has the popularity of sweet clover been because the crop does not have faults. Fifteen years spent in learning to understand the sweet clover before farmers began to recognize its value is the reason for its popularity.

The first problem was difficult in getting a stand with 12 to 15 pounds of clover, while 8 to 10 pounds of alfalfa practically always secured a satisfactory stand. The invention of the scarifier and better knowledge of cultural methods solved that problem.

### *Two General Practices*

In wet seasons sweet clover has often grown so rank that it interfered with the cutting of small grain. Many farmers now wait with the clover seeding until the small grain is up high enough to be seen easily down the drill rows. The clover is then broadcast over the field. Occasionally it is rolled afterwards; more often the covering of the tiny seeds is left to the spring rains.

The usual rate of seeding among these farmers is 8 to 14 pounds of

scarified sweet clover seed planted at the time of seeding the small grain. The seeder attachment in front of the grain box is arranged to drop the clover seeds in front of the drill discs. Allowing the tubes of the seeder attachment to direct the clover seeds to the grain tubes, results in the sweet clover being planted too deeply.

With ordinary weather conditions, knee-deep sweet clover is expected at grain harvesting time. Harvesting a 15 to 30-bushel wheat crop or a 45 to 70-bushel oat crop with a rank undergrowth of clover offered another problem to conquer. Of course, if June proves to be a dry month, the clover usually is held in check by the grain crop and does not offer a serious problem.

The river bottom farmers follow two general practices when the clover is too rank. The first thing to do, they will tell you, is to allow the grain to become fully ripe. And the second precaution is never to attempt to run the binder when there is any dampness on the grain or clover. When tractors are used to pull the binders, the plant juice causes plenty of "gumming" on the tractor and binder bull-wheel lugs.

About the only hay crop harvested from sweet clover is that taken off in late September of the year it is seeded. Another value of sweet clover is that the hay is harvested after other work is done. The clover left for the second year is usually for a seed crop or pasture. Often instead of taking off a hay crop the first year, the luxuriant growth is plowed under. Many who have grown the crop and plowed it under the first year will say that the following spring the clover will sprout as volunteer growth and just about take any crop planted. Oftentimes the fall-plowed clover field will have the appearance of a prosperous alfalfa or clover patch about the time the owner wants to plant corn.

When the above condition exists, the bottom farmers as a rule list their corn and follow closely after planting with "go-devils" or weed-cutters. These machines have discs on either side of the furrow which cut off most of the plants left on the ridges. Where corn is to be check-rowed, the practice of plowing up the clover sod late in the spring is followed as the only remedy.

Occasionally a field is found where the sweet clover appears to have taken everything. A few years ago a farmer a few miles west of Missouri Valley was unable to cultivate his corn after planting because of wet weather. The clover appeared to have taken it and he was about to turn the stock into the field. Then he happened to notice that the corn was about as thrifty looking as the clover. In fact, that fall the corn yielded nearly 40 bushels to the acre and had not been cultivated once. The farmer gave as his explanation the fact that the clover kept down the other weeds which would have used more moisture than the clover did.

### *Soil Building Properties*

The sweet clover hay as handled by these farmers causes little trouble to the livestock in the way of bleeding profusely from slight wounds. The farmers are not certain why they have been so successful with it unless it is because of the fact that a strawpile is always available to the stock when on pasture. The hay cut in the fall has either wheat or oats stubble and straw in it and it is thought by many of the farmers that the straw balances up what the clover hay lacks—or provides what is needed to keep the blood of the animals in proper condition.

No story of sweet clover in western Iowa or the Midwest would be complete without some mention of its soil building and reclaiming properties. It has played an important part in reclaiming certain permanent pastures in the rough sections along the Missouri and Big Sioux rivers. Some of these areas have been notoriously unproductive. The best

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# Putting "Pep" into Farming

*By E. R. Lancashire*

Ohio State University

When a county agent gives advice to his farmers, it is as if he gave them signed blank checks. The wise farmer makes his worth a large figure.

FARMING is fast becoming a game in many parts of the country. "Putting Pep into Farming," is one of the major parts played by the extension services of the agricultural colleges and universities of the United States.

The central figure, aside from the farmer, in this extension activity of the schools of agriculture is the county agent. This officer is the local representative of the State agricultural college. He should know practically all the farmers in his county, and when they are willing to cooperate with him, he can usually be of invaluable aid to them in making their business more interesting as well as more profitable.

Some leaders in the business world outside of farming tell their employees that the customer is always right. In farming a low yield or other cause of insufficient return for the amount of time and money invested is often traceable directly to the farm operator. A further comparison of farming with other business reveals that farmers as a whole are more successful than those engaged in other non-professional occupations. Statisticians state that there are two successful farmers for every one successful non-farm business man considering an equal number of each kind.

Farmers who study their business and who are operating their business with sufficient capital usually classify as successful. It is among such men that the county agent finds plenty of the cooperative spirit.

One of the best ways of "Putting Pep into Farming" is that of staging State-wide contests. Clubs covering nearly every branch of agriculture are now in operation in most of the States.

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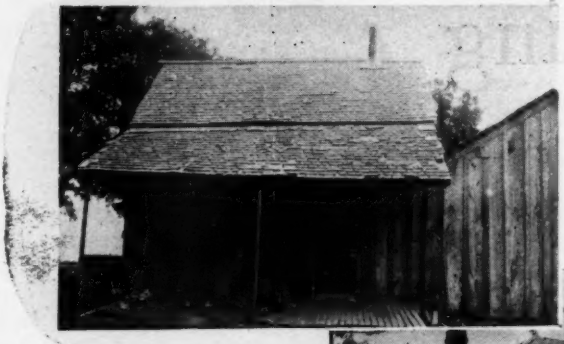
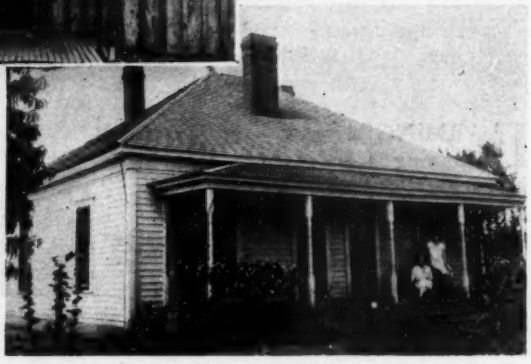
# A Mortgage Company that Leads the Way

*By Charles Kilpatrick*

Ft. Smith, Arkansas



Below: New house on farm taken over by Pioneer Mortgage Co. built to replace original house, so as to attract a better tenant to rent the farm.



MANY farmers in southeastern Oklahoma, largely due to the "merciless" robbery of their farms by a one-cropping system and because they had allowed the fertility of their soil to wash and leach away to such an extent that they could no longer provide a living for their families, either have moved away or "given up the ghost." They have let their farms go to one of the many farm loan companies operating in that section of the State.

The Pioneer Mortgage Company of Oklahoma City, Oklahoma, inherited their share. It was an encumbrance on their hands, yet they had their money tied up in it and did not want to foreclose on the land.

Mr. Frank T. Blair, manager of the company's interests, had faith in southeast Oklahoma, or he would not have loaned money to the farmers in the beginning. He still has faith and believes that with good cultural methods and a well-balanced system of farming the unfortunately acquired land can be made an asset rather than a liability. He had a vision and saw an opportunity for the company to "come out" if the land was put into the proper state of cultivation and properly managed. For this job he hired Earl Hayes, a young man of unusual executive and leadership ability and a former 4-H state terracing champion, to service and manage the firm's farms in six counties.

Young Hayes faced a most difficult task in securing desirable tenants. Good farmers did not want to move onto abandoned farms, especially as most of the farms were in a deplorable, run-down condition. Houses were unpainted and unscreened; barns had fallen in; weeds in general

had taken the place; each farm had a "black eye reputation" in the community, except in a few instances.

The Pioneer Mortgage Company, realizing that proper living conditions were prerequisite to securing the highest type of tenant, set about to tear down, rebuild, paint, or remodel the houses, and install running water. Barns were made over, new fences built and old ones repaired, and a general home beautification program put into effect. In many instances new wells were drilled or the old ones cleaned out and put into sanitary condition.

The company did not stop at providing the best of living conditions, but set about to reclaim and protect the soil fertility. A tractor and three modern terracing machines were purchased, and before the crop season this past year, young Hayes, with three crews which he moved from farm to farm, had completed 20 miles of terracing, embracing over 1,000 acres. The tractor was kept busy every day terracing, plowing under deep the last year's crop residue or fighting Johnson grass that the former owners had allowed to overrun the farm. Cowpeas were planted in alternate rows with corn, and a number of alfalfa fields have been started to restore the organic matter and to give new life to the soil.

The tenants were encouraged to use the best of seed, and believing in fertilizers, this company conducted a number of demonstrations the past year to determine the best grade and proper amounts to use. They particularly tested out the value of potash, varying the potash content from nothing to eight per cent. They were agreeably surprised when they found that the eight per cent potash in the fertilizer mixture gave an increase of 180 pounds seed cotton per acre over where the potash was left out. The Pioneers were unselfish in their farm-developing program, and joined hands with the county extension service and business men in promoting a farmers' educational tour. Seventy-five men saw their fertilizer demonstrations and their many other improved farm and home practices.

### *Spend Less Than They Earn*

The company does not approve of their farmers spending more than they make. They encourage them to have a good garden. A half-acre plot of a uniform fencing is provided for each farm. The cow, sow, and hen program is most heartily endorsed. Each

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Earl Hayes, the Pioneer Mortgage Co., directing work on farm improvement. Fighting Galveston grass that had been allowed to overrun a farm.

# *Fertilizing the*

# KAW VALLEY

*By Walter B. Balch*

Kansas State Agricultural College

**These potatoes show that it also pays to use a correctly balanced fertilizer in Kaw Valley, Kansas.**

THERE are three reasons for the use of commercial fertilizers. They are: first, to replace the plant food taken out of the soil by a crop; second, to improve the quality of the crop; and third, to increase the production. It is pretty hard to prove the first two effects of a fertilizer, but very easy to see if the crop is increased or decreased by the use of a given fertilizer. After one has determined the analysis which gives the biggest increase, it is necessary to determine the cost of the fertilizer and see if its application pays a profit.

All that is being tested out in the Kaw valley of Kansas for the benefit of the potato growers. Those interested in the crop and working on the problem are growers of potatoes, county agents, fertilizer salesmen, and various folks from the Kansas Agricultural College.

The idea of fertilizers first was seriously considered about 15 years ago. Tests were run for about five years

TABLE I

POTATO FERTILITY TEST

Conducted by James Trant, Edwardsville, Wyandotte County, Kansas

| Plot | Treatment | Yield in bushels 1922 | 1923 | 1924 | 1925 | Average 4 yrs. |
|---|---|---|---|---|---|---|
| 1 | Superphosphate 160 lbs. | 123 | 193 | 145 | 200 | 156 |
| 2 | Check | 121 | 190 | 166 | 196 | 168 |
| 3 | Sodium nitrate 80 lbs.<br>Superphosphate 160 lbs. | 135 | 193 | 157 | 236 | 180 |
| 4 | Sodium nitrate 80 lbs.<br>Superphosphate 160 lbs.<br>Potash 50 lbs. | 146 | 202 | 181 | 253 | 195 |
| 5 | Check | 151 | 190 | 160 | 221 | 180 |
| 6 | Potash | 139 | 202 | 194 | 243 | 194 |
| 7 | Barnyard<br>Manure 5 T | 158 | 220 | 214 | 270 | 215 |
| 8 | Check | 142 | 199 | 192 | 177 | 177 |
| 9 | Barnyard<br>Manure 5 T<br>Superphosphate 160 lbs. | 150 | 214 | 203 | 265 | 208 |
| 10 | Green manure | 136 | 172 | 166 | 231 | 176 |
| 11 | Check | 127 | 183 | 171 | 197 | 169 |
| 12 | Superphosphate<br>Green manure | 128 | 189 | 140 | 205 | 165 |

and then dropped without any positive results. Later investigations showed that the failure of the fertilizers to be profitable was due to the small amounts applied, the analyses used, and the broadcasting of the material instead of rowing it in at the time of seeding.

In 1922 a series of fertilizer plots were laid out on the farm of James Trant of Edwardsville. They were conducted for four years and Table I gives the results of this work.

It will be noticed in checking over the averages of Table I that the untreated plots in every case but one gave a smaller crop than did the treated plots. This indicated very clearly that a fertilizer program was desirable.

Various tests and plots were laid out in various counties, but no definite steps were taken for an organized problem until 1928 when two plots were laid out. One was on the farm of Charles Speaker of Wyandotte county and the other on the farm of James Trant, also of Wyandotte county. Here again increases in yields were consistent with the amount of fertilizer used, the best results being obtained with a 5-10-5 fertilizer applied at the rate of 500 pounds to the acre.

The cost of this material was $11.50 while the average increase in the returns was 56 bushels. If the potatoes were worth only fifty cents a bushel net, there would be a good profit on the $11.50 investment for fertilizer. The next best fertilizer was a 4-8-6 applied at the rate of 500 pounds to the acre, which cost an even $11.00 and gave an increased return of 27 bushels per acre.

In 1929, Myron Kelsey, in Shawnee county, and W. R. Stiner, in Douglas county, set out identical plots in triplicate. The idea of the triplication on

(*Turn to page* 48)

Duncan Wheeler, of West Kingston, R. I., sees the advantage of adding 200 lbs. muriate of potash per acre as a topdresser (left) compared to no potash (right).

# Top-dressing Hay Lands

*By Thos. H. Blow*

Springfield, Mass.

AN application of muriate of potash at 200 pounds per acre practically doubled the hay yield on the farm of Duncan Wheeler, West Kingston, Rhode Island, in 1929.

This was not the first experience of Mr. Wheeler with potash, neither was it the first response he had received from its use. It was a question, however, of whether with existing farming conditions and prices of dairy products, he could afford to use fertilizer on his hay land.

The field treated was in its second year of hay, contained a good sod of red clover and timothy, and was of a light loam nature. The potash was applied early in May as a top-dressing and at the rate of 200 pounds per acre. On June 11 (harvesting time) a very distinct difference could be noticed between treated and untreated areas.

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Left—with 200 lbs. muriate of potash, the yield was 4¼ tons dry hay per acre.

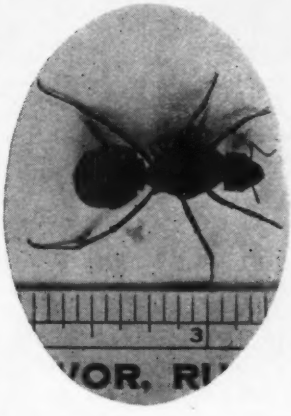
Right—Without potash, the yield was 2½ tons dry hay per acre.

# Leaf-cutting Ants

*By W. L. Wilkinson*

County Agricultural Agent, Kingsville, Texas

THE leaf-cutting ants, sometimes called village ants or night ants, are a pest of constant annoyance in the rolling sandy sections of the Southern States.



They cut off leaves from trees or cut down field crops and carry them into their nests to use in making a pulp or culture medium for a certain species of fungus which they cultivate with great care for their food. If field crops or orchards are planted anywhere near a village of cut-ants, much damage is apt to occur. They have been known to defoliate several trees or to cut down an acre of small cotton or young grain sorghum in a single night.

Cut-ants usually build their villages or nests in the woodlands or in uncultivated fields. These villages consist of mounds of dirt 10 or 12 feet across, made from the dirt the ants carry out while building their homes. Many openings in these mounds lead down to small compartments in the ground and finally to the large breeding and feeding chamber of the colony. The main cavities, where the queen of the colony may be found reigning supremely, are usually 12 or 15 feet below the surface of the ground.

From December first until March first is the best time to destroy these villages. The ants are usually pretty well established in their winter-quarters by December first and then can be destroyed easily. If they are allowed to remain unmolested until March first, about the time the queen larvae begin hatching, the opportunity for controlling them is not so good. It is then that the hundreds of new queens scatter out over the surrounding territory for the purpose of starting new villages.

### *Easily Controlled*

Cut-ants may be controlled very easily when the right method is used. However, many farmers spend more time and money than it would take to do the work right in trying to get rid of these ants without doing the necessary manual labor that is required. Some have tried to kill them by pouring kerosene oil in the many holes of the mound. Others pour crude oil or waste engine oil in these holes. Some have even tried to kill them by burning old inner tubes in the nests.

There is only one sure way of destroying a village for good, and that will take about 30 minutes of hard work. The proper method is to get a hole from the surface down to the

This is a picture of the pulp and fungus that is used for food for the cut ants. This was found 12 feet underground on W. S. Trant's farm in Kleberg county. This is found in large quantities in the main cavities of cut ants. There will be as much as a 12 qt. bucket full in one cavity.

main cavity where the queen stays, where the eggs are deposited, and where the many underground tunnels that reach out hundreds of feet in all directions terminate. The most convenient way to get this done is to use a four-inch shallow well augur with extension rods for deep work.

### *Treat All Villages*

Starting in about the center of the mound, one can always tell when the main cavity is reached by the way the augur drops. The augur usually drops into small cavities from six to eight inches in diameter after getting down two or three feet, but when the real cavity is reached there will be a drop of from 16 to 18 inches, and this is not found less than 8 or 10 feet below the surface.

When the main cavity is reached, dig a hole about a foot deep by the side of the four-inch hole. This hole should be large enough so that a shallaw can about two inches deep and six inches in diameter can be placed in it. This can will then be about eight inches below the surface of the ground. Pour a pint of carbon disulphid in this can, place a board over this and the main hole, and after placing a paper over this board so as to keep the dirt from falling through, cover this board with about a foot of dirt, packing it down with a shovel so as to make it as nearly air-tight as possible. The fumes from the carbon disulphid, being heavier than air, will go down the four-inch hole to the main cavity and penetrate the tunnels and kill the ants that are at work with the food and eggs, also killing the queen and her attendants. If left for several days, the fumes will kill all the workers as they come in from the fields, thus destroying the entire colony.

One should never throw a lighted match into the can of carbon disulphid as this is dangerous and besides this will destroy all the fumes. Although it will kill most of the ants present, it will fail to destroy those out in the fields, and these ants will come in, raise another queen from the eggs, and start a new colony. One should treat all the villages on the farm, and get his neighbors to do likewise, for one untreated village will soon infest the entire farm.

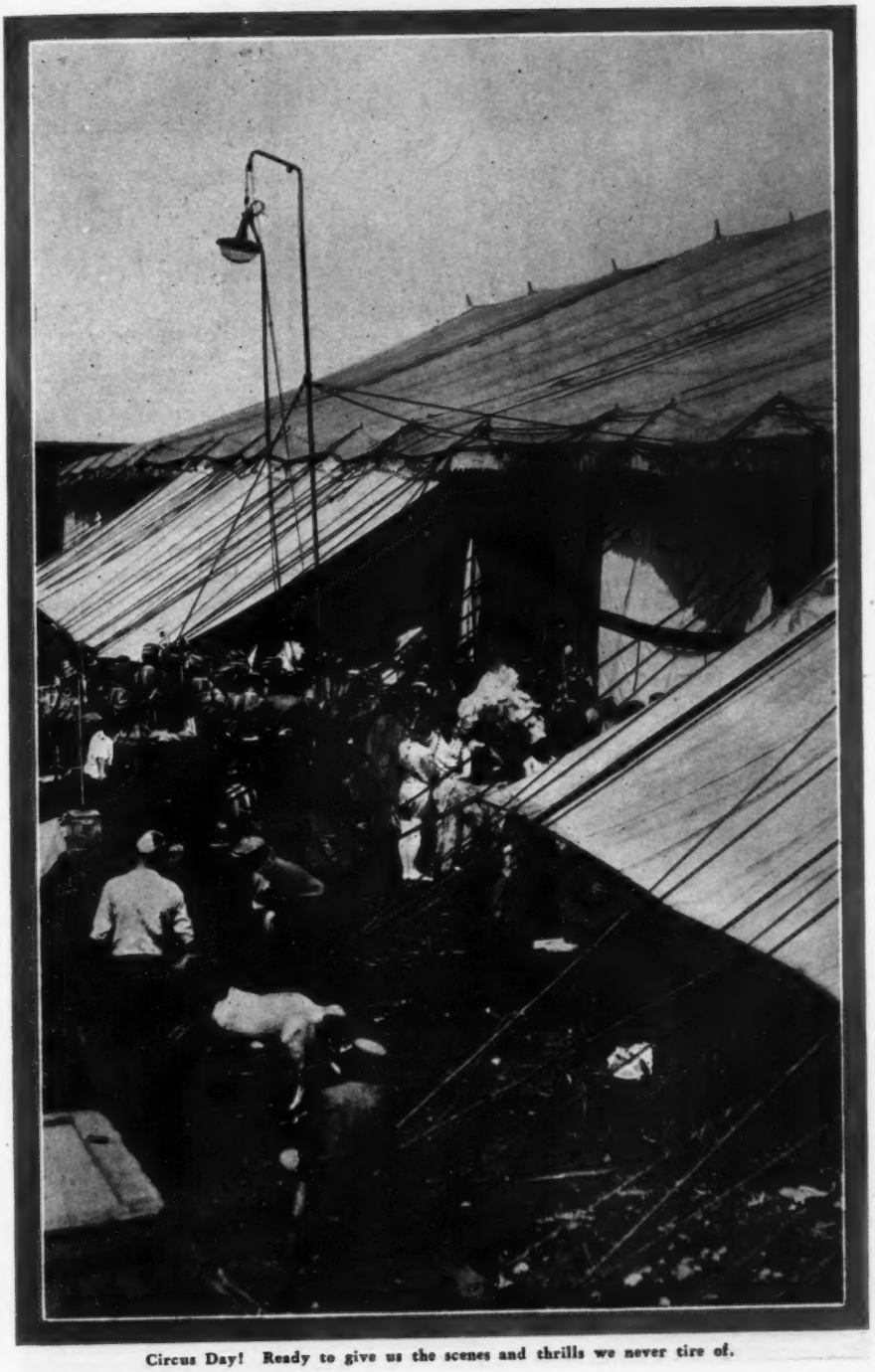
Ready for a dip—with the latest style bathing suit.

## PICTORIAL

100% Americans—Squaw and Papoose of the Blackfeet Tribe.

A Chief of the Sioux Tribe.

A reminiscence of bygone days.



Circus Day! Ready to give us the scenes and thrills we never tire of.

**Summer time is preserving time, both at home and in the cannery.**

# The Editors Talk

## What Does Your Food Cost?

A farm family of four with a five-year old boy and a two-year old girl would spend about $525 a year for food, according to Janet W. Bump in a recent issue of "Farm Economics." At the prices they would pay at the store, they could easily save $150 a year by using home-produced milk, eggs, and some of their fruit, vegetables, and meat.

This ties up with the Ohio State University's idea that farmers spend too high a proportion of their income for food. It is not an accusation that farm folks eat too much, but rather that they do not produce enough of what they eat on their own farms.

With the present price level on all things which the farmer buys higher than on the things which he sells, it does not take much effort to figure the economy in raising as much of the family's food as possible. Dairy farmers have an excellent chance to use milk more freely. It is their cheapest and most helpful food. Gardens are a source of food throughout the year, for with modern canning methods and a little foresight on the part of the home manager, cellars can be filled with supplies to last until the garden comes on the next year. The same principle applies to the farm families who can raise fruit and their own meats.

In the matter of food, the farm family has a distinct advantage over the city family. It can have better food than is available in any city and at considerably less cost.

## The War Is On!

We are in the midst of the annual battle with insect pests. Just what it costs farmers to wage this war never has been and probably never could be estimated with any accuracy. It is certain, however, that they take a greater toll of the earnings of mankind than any other group of tax collectors.

Broadly speaking, insects can be divided into two main groups, those pests harmful to humanity and those which destroy the crops upon which man depends for his livelihood. Of the first group probably the most destructive is the Tsetse fly, estimated to have killed more than 2,000,000 people in the past 10 years. The tick, the mosquito, the house fly, and the flea are other insects in this group.

It would be difficult to rank the Mediterranean Fruit Fly, the Boll Weevil, the Codling Moth, the European Corn Borer, the Gypsy Moth, the Hessian Fly, and the San Jose Scale according to their destructiveness to our major crops. Each takes its share of the great toll.

And so in the midst of another growing season we are again in the midst of the annual battle. Like in any other warfare, new means of attack are constantly being discovered. There will be some this year and the results will be anxiously awaited.

## The Americas Will Discuss Farming

North America will meet Latin America in Washington next September for a broad discussion and examination of the problems of agriculture that affect or are common to the two continents. The conference has been called for September 8 to 20 and special attention will be given to agricultural problems of an economic and scientific nature.

Called in accordance with the resolution of the Sixth International Conference of American States at Havana in February, 1928, the coming assembly will be the first Pan American gathering to deal exclusively with questions related to agriculture. Officials in charge believe it promises to be at least as important as any previous gathering for any other purpose in which the two continents have joined forces.

Problems of intercontinental concern will be discussed in their broadest scope and with a view to formulating plans for effective continental cooperation in the development of the agricultural industries. Both governmental agencies and private organizations will participate, and the conference will endeavor to promote cooperation between governments and private citizens in the study of the problems presented.

The conference will consider broadly the problems of research in agriculture and forest development and methods of preventing and eradicating diseases and pests affecting plants and animals. Sponsors of the conference also anticipate that in discussing agricultural economics the members will explore the problems of competition now beginning to bear heavily on the nations in the tropical and subtropical regions of this hemisphere. Tropical countries of other continents offer growing competition in production of rubber, coffee, sugar, cacao, cotton and other vegetable fibers, tobacco, and citrus fruits. In many of these products the New World formerly enjoyed practical freedom from competition.

The conference will also consider plans looking toward a coordination of research by groups of the American nations acting in harmony to improve and develop the crops in which they have common interests. It will study the latest scientific methods for both the growing and the marketing of agricultural products.

This is a broad step in the right direction. From it should come understandings of definite value to our American agriculture.

## The Farmer's Position

General business depression has had its effect on agriculture, yet the farmer today is potentially and actually in better position than the city man. This conclusion is drawn after a survey of the agricultural situation by the Corn Belt Farm Dailies during the latter part of May.

The farmer is never out of a job, the report goes on to say. The worst that can happen to him, outside of actual bankruptcy, is reduced income through lower prices. He is fortified to meet that situation. He always has a home for his family, and in case of necessity can draw on the resources of his own farm for food.

While the level of farm prices is much below a year ago, the decline has not been as great as in the case of commodity prices in general. Thus the farmer's relative position is actually improved. Another point in this connection is that the heavy end of the farmer's marketing of last season's pro-

duction came before the big break in prices last fall. As evidence of the significance of this statement is a report from the Iowa State College on the 1929 incomes of a group of Iowa farms. "Four hundred and fifty farms, or 69 per cent of the 650, showed a profit in 1929, while 250, or 31 per cent, showed a loss. In 1928, 65 per cent of the farms showed profits." The 1929 returns were some better than the 1928 returns, and 1928 was counted a good year.

Even now farmers are not complaining so much of low prices as they are of "lack of money," this meaning merely lack of credit, a situation aggravated in some communities by banking weakness. As a result of general depression this weakness is coming to the surface, and being wiped out through failures having their inception years ago. The result will be a more healthful condition.

## The Pasture Awakening

Centuries of pasturing with no return of fertilizer elements other than deposits of liquid and solid manure by grazing animals have resulted in a state of soil fertility depletion that seriously threatens the stability of the stock-raising industry.

The seriousness of this situation was first sensed in Europe by far-sighted scientists, and definite steps have been taken to effect a desirable change. European farmers today quite generally accept the findings of these investigators and are rapidly bringing themselves to a realization of the fundamental value of rotative grazing. Recently there has been developed in Europe a system of pasture management known as the Hohenheim system. This system involves both rotative grazing and the replacement of minerals by application of commercial fertilizers.

Farmers in the United States are rapidly awakening to the need for pasture improvement. This new interest is probably largely the result of economic conditions and to some extent to the activities of research workers in the scientific field as well as in industry.

Among the outstanding contributions in the industrial field during recent months are a bulletin by the National Fertilizer Association entitled, "Pasture Top-dressing with Fertilizer and Lime in the Hay and Pasture Belt," and another bulletin by the Agricultural Service Bureau of the American Agricultural Chemical Company entitled, "Facts About Pasture Fertilization and Mineral Deficiency." The author of the latter bulletin, Dr. H. J. Wheeler, formerly Director of the Rhode Island Experiment Station, presents in a most interesting manner the high lights of the problems of pasture management for a large part of the civilized world. He lays special emphasis on the role that research has played and must continue to play in pasture investigations if our animal population is to keep pace with that of man with his ever-increasing need for animal products.

Speaking of the ills of inadequate fertilzation, whether on pasture or other crops, Dr. Wheeler says: "One-sided fertilization of pastures with single elements is likely to have the same unfortunate result in the end as in orchards. By the use of nitrogen alone, the various elements are removed from the soil by the larger grass crops at a far greater rate than before. This naturally hastens the time when one-sided mineral exhaustion will not only begin to have its effect on the yield of milk and beef, but also on the ability of the animals to bear vigorous offspring or even to reproduce at all. The orchard parallel is seen by the fact that the orchardists of Arkansas, for example, who have practiced one-sided fertilization with nitrogen are beginning to observe like orchardists

in Delaware, New Jersey, Pennsylvania, and elsewhere, serious effects on the health and bearing quality of their trees."

The pasture-orchard parallel with regard to mineral plant food deficiencies serves admirably to emphasize the importance of having a sound soil fertility program. It is hoped that the awakening interest in pastures evidenced on every hand will not only bring abundant prosperity to the livestock industry, but that it will give impetus to a similar awakening in other branches of agriculture.

## Publicity

One of the essential factors of the general life of any modern community that directly or indirectly affects industry is publicity.

Thirty to fifty per cent of any modern newspaper's space is devoted to news on industrial affairs in all their phases. A long course of circumstances has produced this intensiveness in public interest in industry and what industry is doing. There has thus resulted a unique intimacy between industrial life and the general life of the nation. This is a fundamental phenomenon, especially peculiar to the industrial progress in the United States.

Publicity in its best sense, therefore, means a widespread public intimacy and sympathy with the workings of industry.

This modern development imposes a special duty both on industry and on the public; on industry, that it works in the public view, that it gives the facts, and that it works ultimately for the good of society as well as for its own profits.

It imposes a duty on the public that they demand the facts and not politics, that they will demand to know every side from the best sources, and above all it imposes a growing economic, moral obligation on every group of the public press, that they endeavor to represent to the public, facts and all the facts regarding industry.

## Balance

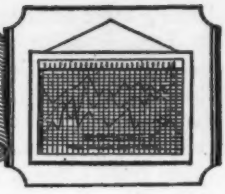
There were 500 New York State farmers involved in a recent economic survey. Out of the 500, 250 had better than average crop yields. Out of the 250, half of them had better than average milk production per cow. Out of the 125, 62 had better than average volume of business. Half of that number had better than average farm equipment. About 30 were making money whether times were good or bad.

The reason that these 30 were making money was because of a balanced program in which ALL activities were better than average.

Out of 500 business firms, 250 have better than average advertising. Out of the 250, half may have better than average financing. Out of the 125, half may have better than average systems of distribution. Of this number, half may have better than average staff efficiency. About 30 will be making money whether times are good or bad.

Neither nature nor modern business has any use for the single track mind. The essentials for success, whether it be the success of an organization or the success of an individual, depend upon balance.

# AGRICULTURAL DEVELOPMENTS



*By* L. C. Farle

## "LANDING FIELDS" FOR BIRDS

The establishment of five bird sanctuaries and one public shooting ground in important wild-fowl areas of four Canadian Provinces within the past year indicates that Canada is fulfilling her obligations under the migratory-bird treaty, which protects birds migrating between that country and the United States, according to Paul G. Redington, chief of the Biological Survey of the United States Department of Agriculture, who has written the commissioner of the national parks of Canada, congratulating him upon the progress made by Canada "along this most important line of conservation."

The United States has already set aside a number of similar refuges, or "landing fields," for migratory waterfowl, and, in accordance with the migratory bird conservation act of February 18, 1929, will purchase lands for other sanctuaries, it is anticipated, when funds appropriated become available after the 1st of July.

## LOCUST OF OLD WORLD SAME AS GRASSHOPPER

The locust of Egypt and Palestine, whose present-day devastations have been mentioned frequently this spring in newspapers, is really a grasshopper, the United States Department of Agriculture says, and is very similar to the kind of grasshoppers expected in damaging numbers in the Dakotas and Montana this summer. But the periodical Cicada, often erroneously called the "13-year" or "17-year locust," a distinctly different insect, will also appear on the scene this year. In the more nothern localities each brood of this insect appears every 17 years, but in the South the broods appear every 13 years.

A general swarm of "17-year locusts" (Brood IV) is due this summer in southwestern Iowa, western Missouri, eastern Kansas, northwestern Oklahoma, and a few in northeastern Texas and perhaps Arkansas.

A few individuals of "13-year locusts" (Brood XXIX) will appear this summer in upper South Carolina, northern Georgia, and Oklahoma, and a few next year in Missouri and Louisiana.

The periodical Cicada, or "locust," lives only a few weeks in its adult winged stage, during which it seldom takes food, and, in general, does no damage except in puncturing tree twigs and laying eggs in them. This causes a natural "pruning" of the punctured twig ends. Young trees, however, are sometimes killed by the punctures, so it is best not to set out young orchards during the spring of "locust years" and not to prune the trees, especially the young trees, heavily the winter before.

## BARBED QUILLS PROTECT PORCUPINE FROM FOES

A mouthful of porcupine quills is anything but a savory dish for any enemy of this self-confident animal.

Misguided and overzealous attackers, such as coyotes, often lose their appetites and even starve after col-

lecting some of the tenacious and finely barbed quills in their noses or mouths, or in their tongues or cheeks. Frequently at water holes in forests range cattle will sniff at a porcupine and, in return, receive a noseful of quills from a flip of the heavily barbed tail. The sharp quills imbed themselves more deeply with each attempt to remove them, causing intense suffering and sometimes death.

Thus protected the porcupine usually goes its way unhindered, and in its quest for food it may destroy young fruit and forest trees, or vegetable crops, or wallow down alfalfa. According to Leaflet 60-L, Porcupine Control in the Western States, by Ira N. Gabrielson and E. E. Horn, of the Biological Survey, issued recently by the United States Department of Agriculture, the porcupine in many areas has branded itself as a pest that must be controlled. But in many parts of its extensive range it does no serious harm and is tolerated because of the interest that attaches to a native wild animal.

Porcupines in the Northwest winter in the cliffs and lava rims of the mountains. In the Southwest they go to the lower forests for the winter. This makes it possible to find them close to their dens when snow is on the ground and to shoot them, often in sufficient numbers to effect satisfactory control. In summer it is easy to locate their winter dens by the girdled trees. Taking advantage of the porcupine's fondness for salt, foresters, ranchers, and rodent-control workers of the Biological Survey bait them near their dens with a half-and-half mixture of salt and powdered strychnine.

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## DESTROY "BAD" EGGS

To lessen the possibility of American housewives finding a bad egg, the Pennsylvania Department of Agriculture is asking the 700 hatcheries in the State of Pennsylvania to cooperate in destroying inedible eggs. The Department estimates that out of approximately 75 million egg set in the 700 commercial hatcheries in the State annually, 10 million prove infertile and that an additional 25 million fail to incubate. Recent investigations have disclosed that some "incubator reject eggs" of very doubtful composition are finding their way into food products. The State laws prohibit the sale for food purposes of inedible eggs which have been held in incubators for a time and then rejected for failure to incubate. The hatcheries are being asked to cooperate in enforcing the law by denaturing inedible eggs, especially all eggs which fail to incubate after having been held in incubators for 15 and 18 days or longer.

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## DIET AND THE PRICE OF WHEAT

The "boyish" figure is to a large extent responsible for the low price of wheat, according to Professor James E. Boyle of Cornell University. The fact that the United States is consuming 20 per cent less bread than it did a few years ago is given for one reason why the world's short wheat crop is selling cheaply. Statistics show that people are eating less bread and more buttermilk and cheese. Meat consumption has fallen off and the use of fresh fruits and vegetables of all kinds has increased. More oranges, grapefruit, pineapples, lettuce, tomatoes, and cantaloupes are being eaten by people who wish to remain thin. An interesting fact in this connection is that the French, the largest bread eaters of the world, are still among the slenderest of the nationalities.

Professor Boyle considers that all these changes in consumers' food habits must be reckoned as market developments, for the consumer is the most important factor in marketing farm produce.

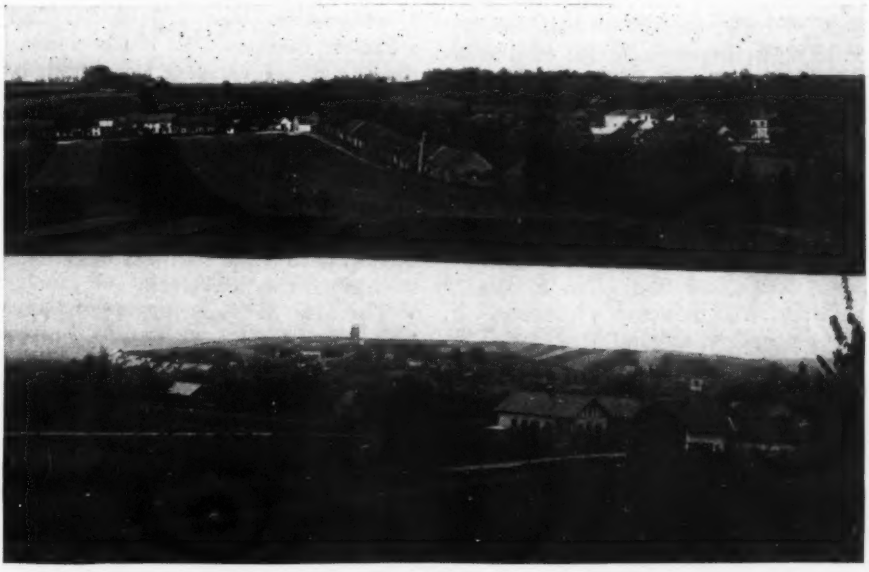
# In Czechoslovakia

*By Otakar Horak*

Iowa State College

WHEN 12 years ago Czechoslovakia became an independent country on the northern and northeastern territory of the former Austria-Hungary, the first leaders of the country planned many radical reforms in order to give to their country the most up-to-date organization. Some new social legislation was enacted, particularly that regarding the 8-hour working day, and one of the greatest undertakings for the improvement of the conditions of the farming population was the land reform.

As a consequence of the World War the value of the agricultural class became more appreciated in all countries of Europe. Cultivators of land in various countries organized themselves into a powerful class of citizens. As such an organization, they influenced the laws of their countries. In the countries with a great number of tenants on the large estates, this class demanded legisla-



tion which would enable tenants to acquire land.

Such legislation was enacted in Rumania in 1917. In Yugoslavia the preparation of the land reform was begun in 1919, and in Bulgaria in 1921. Poland and Lithuania passed similar legislation.

One of the most remarkable enterprises of this kind was the Land Reform in Czechoslovakia. An idea about the conditions among agricultural population previously to the reform can be obtained from the following facts. More than one-fourth of land in Bohemia (western part of the country) was owned by less than two per cent of the landowners. Nearly one-third of the land in Moravia was owned by less than one per cent of the landowners. In Slovakia about three-tenths of one per cent of the number of holdings covered 40 per cent of the whole area, while 21.5 per cent of the number of holdings were less than one acre in size.

The largest estates need comparatively few people for the cultivation of a unit area. This was one of the reasons for an extensive emigration of dissatisfied peasantry. The number of Czechoslovaks living abroad had been estimated at 2,300,000. Under these conditions the land reform obviously was considered an economic betterment for the people.

### *Lands Confiscated*

Another reason for the reform was that after the battle of the White Mountain, in 1620, most of the great estates belonging to native nobility were confiscated and given to aliens, military, and political supporters of the emperor Ferdinand.

When the constituent National Assembly of the Republic was formed in 1918, one of the first things discussed was the unhealthy economic condition resulting from the existing division of the land in the country. A bill for the distribution of great estates to the peasants was submitted. There was a disagreement among the major political parties of the National Assembly, as to the execution of the land reform.

The Social Democratic Party proposed to convert the expropriated estates into socialistic enterprises, since the representatives of the party believed that only large areas could be utilized fully and rationally. The Agrarian Party proposed the division of the large estates into middle-sized farms and giving them into ownership of the cultivators hungry for land. Finally the Assembly agreed on the expropriation of the estates, the creating of the Land Office, and of a committee for the solution of all questions dealing with land reform.

In the first law of April 16, 1919, regarding the land reform, and providing for the expropriation of land, the estates are defined as units comprising more than 370 acres of arable land, or 620 acres of various kinds of land. These figures represent the amount which an owner of an expropriated estate may retain. In no case should he be allowed to keep more than 1,200 acres. The first law was only a framework and it provided for supplementary laws.

The reform was from the very first a national as well as a social and economic question. In the beginning the idea of colonization was especially considered. It was assumed that great numbers of Czechoslovaks living abroad would wish to come back and would colonize the expropriated land. The increased number of small owners was expected to enlarge the conservative rural element and thus strengthen the new state.

The law of June 11, 1919, provided that the Land Office should be responsible to the Cabinet and should have at its head a president and two vice-presidents appointed by the president of the Republic. One of the duties of the Land Office was to determine what estates fall under the law providing for expropriation, and

(*Turn to page* 58)

# REVIEWS

This section contains a short review of some of the most practical and important bulletins, and lists all recent publications of the United States Department of Agriculture and the State Experiment Stations relating to Soils, Fertilizers, Economics, Crops, Crop Diseases, and Insects. A file of this department of BETTER CROPS WITH PLANT FOOD would provide a complete index covering all publications from these sources on the particular subjects named.

## Fertilizers

"Some Effects of Potassium Deficiency on the Histological Structure and Nitrogenous and Carbohydrate Constituents of Plants" is the title of a new bulletin, No. 499 from the New Jersey Agricultural Experiment Station. The authors, G. T. Nightingale, L. G. Schermerhorn, and W. R. Robbins, have reviewed published data of several scientists in this country and abroad and have presented results of their own rather extensive laboratory experiments with tomatoes, beets, carrots, parsnips, and narcissus. They summarize these data as follows:

1. Potassium appears to be directly or indirectly essential for carbon dioxide assimilation, and therefore the concentration of carbohydrates may be low in potassium-deficient plants.

2. Carbohydrates frequently accumulate in potassium-deficient plants, apparently because the rate of nitrate assimilation is retarded.

3. Translocation of sugars and digestion of starch can take place freely in plants extremely low in potassium.

4. Cell wall thickness and development of mechanical tissue are intimately associated with the carbohydrate content of the plant and apparently only indirectly with potassium.

5. Potassium appears to be directly or indirectly essential for the initial stages in nitrate reduction in the plant.

6. Potassium is directly or indirectly essential for cell division and probably for synthesis of proteins of meristematic tissue.

7. By inference it would appear that potassium is not directly essential for the later stages in synthesis of "storage" proteins, as the percentage of total protein may be comparatively high in potassium-deficient plants whereas the proportion of meristematic tissue is invariably low.

8. Most of the potassium in the plant is water soluble and, when present in limited amount, is translocated freely from older tissue to regions of cell division.

9. Prolonged activity of cambium in older tissue is therefore inhibited under conditions of potassim deficiency. Accordingly stems or storage roots of low-potassium plants increase very little in diameter, but, as the meristem of stem or root tip contains most of the potassium in the plant and is active, there may be considerable increase in length.

10. Lack of potassium likewise will limit the development of cork cambium or the initial embryonic layer of the abscission zone.

11. Potassium-deficient plants die prematurely if fruit is present, because most of the potassium in the plant is eventually translocated to the fruit, as a result of which the stem tip dies and ultimately the entire plant.

*"The Extension Service Method of Fertilizing Crops," Univ. of Ark., Fayetteville, Ark., Ext. Cir. 273, Jan., 1930, D. J. Burleson.*

*"Selection and Mixing of Tobacco Fertilizers," Agr. Exp. Sta., Storrs, Conn., Bul.*

143, *Jan.*, 1930, *J. S. Owens and P. J. Anderson.*

*"Standard Ratio Fertilizers in Massachusetts or The New England Nine," Agr. Exp. Sta., Amherst, Mass., Ext. Leaflet 74, Revised Jan.*, 1930, *A. B. Beaumont.*

*"The Influence of Lime in Vegetable Growing," Agr. Exp. Sta., New Brunswick, N. J., Bul. 498, March*, 1930, *A. W. Blair and A. L. Prince.*

*"Official Report on Feed Stuffs, Commercial Fertilizers, and Agricultural Lime and Limestones", for the fall*, 1929, *Dept. of Agr., Columbus, Ohio.*

*"Sulphate of Ammonia and Nitrate of Soda in a Sod Orchard", Agr. Exp. Sta., State College, Pa., Bul. 249, March*, 1930, *R. D. Anthony.*

*"Commercial Fertilizers—1929," Dept. of Agr., Madison, Wis., Bul. 106, Jan.*, 1930, *W. B. Griem.*

## Soils

*"Some General Field and Laboratory Experiments in Soils," Calif. State Dept. of Education, Sacramento, Calif., Alfred Smith and Fred W. Flint.*

## Crops

One of the most interesting of the crop bulletins received during the month is one on "Sugar Beet Production in Northwestern Ohio" which is being released as Bulletin 102 of the Ohio State University. Representatives of four departments pooled their data to make this bulletin full of valuable and complete information on the culture of this crop. Regarding plant food, the bulletin states that in comparison with other crops, sugar beets use relatively more potash than nitrogen and phosphoric acid. In considering the rotation as a whole, and for Ohio soil conditions, there is not yet sufficient evidence that an application of fertilizer containing a greater percentage of potash than phosphoric acid would be the most economic in the growing of sugar beets. There is, however, sufficient experimental evidence to justify the use of a larger total amount of potash than is now commonly applied to the beet crop. Under certain conditions, potash may so stimulate the growth of the beet plant that beet root is less liable to be affected by diseases. The potash may also materially increase the sugar storage.

*"Berry Thinning of Grapes," Agr. Exp. Sta., Berkeley, Calif., Bul. 492, April*, 1930, *A. J. Winkler.*

*"Irrigation Water Requirement Studies of Citrus and Avocado Trees in San Diego County, California*, 1926 *and* 1927," *Agr. Exp. Sta., Berkeley, Calif., Bul. 489, April*, 1930, *S. H. Beckett, Harry F. Blaney, and Colin A. Taylor.*

*"Yield, Stand, and Volume Tables for Douglas Fir in California," Agr. Exp. Sta., Berkeley, Calif., Bul. 491, April*, 1930, *Francis X. Schumacher.*

*"The Forty-second Annual Report of The Colorado Agricultural Experiment Station," for the year* 1929, *Fort Collins, Colo.*

*"Pastures for Spring and Fall Grazing in Mountains of Colorado," Agr. Exp. Sta., Fort Collins, Colo., Bul. 360, March*, 1930, *Herbert C. Hanson.*

*"Produce Potatoes Profitably," Agr. Exp. Sta., Storrs, Conn., Ext. Bul. 144, Feb.*, 1930, *A. E. Wilkinson.*

*"Annual Report of the President, Georgia State College of Agriculture and the Mechanic Arts* 1929-1930," *Ga. State College, Athens, Ga., Vol. XVIII, Bul. 386, June*, 1930.

*"Lawns," Agr. Exp. Sta., Lexington, Ky., Cir. 229, Jan.*, 1930, *A. J. Olney.*

*"The Production of White Burley Tobacco," Agr. Exp. Sta., Lexington, Ky., Cir. 230, Feb.*, 1930, *E. J. Kinney.*

*"Report of the Agricultural Experiment Stations for the Years* 1928-1929," *Agr. Exp. Sta., Baton Rouge, La., C. T. Dowell.*

*"Cotton Varieties for Louisiana," Agr. Exp. Sta., Baton Rouge, La., La. Bul. 207, Feb.*, 1930, *H. B. Brown.*

*"Management of Farm Woodlands in Louisiana," Agr. Exp. Sta., Baton Rouge, La., La. Bul. 209, April*, 1930, *Gordon D. Marckworth and Robert Moore.*

*"Suggestions for Increasing Corn Yields in Louisiana," La. State Univ. & A. & M. College, Baton Rouge, La., Ext. Cir. 138, March*, 1930, *R. A. Wasson.*

*"The Culture of Peas for Canning," Agr. Exp. Sta., College Park, Md., Cir. 79, March*, 1930, *L. M. Goodwin.*

*"The Corn Crop in Massachusetts," Agr. Exp., Sta., Amherst, Mass., Ext. Leaflet 1, April*, 1930, *M. H. Cubbon.*

*"The Small Grains in Massachusetts," Agr. Exp. Sta., Amherst, Mass., Ext. Leaflet 2, April*, 1930, *M. H. Cubbon.*

*"Oat Tests at the Michigan Experiment Station," Agr. Exp. Sta., East Lansing, Mich., Spec. Bul. 197, April*, 1930, *E. E. Down, H. M. Brown, and F. H. Clark.*

*"American Potato Journal," The Potato Association of America, East Lansing, Mich., Vol. VII, No. 5, May*, 1930.

*"The Quarterly Bulletin," Agr. Exp. Sta.,*

*East Lansing, Mich., Vol. XII, No. 4, May,* 1930.

*"Establishment and Management of the Vineyard," Agr. Exp. Sta., Columbia, Mo., Cir. 236, Dec.,* 1929, *H. G. Swartwout.*

*"The Use of Alfalfa Pasture for Fattening Cattle," Agr. Exp. Sta., Lincoln, Nebr., Bul.* 239, *Mar.,* 1930, *W. P. Snyder.*

*"Fiftieth Annual Report of the New Jersey State Agricultural Experiment Station and the Forty-second Annual Report of the New Jersey Agricultural College Experiment Station for The Year Ending June* 30, 1929," *Agr. Exp. Sta., New Brunswick, N. J.*

*"The Bimonthly Bulletin," Agr. Exp. Sta., Wooster, O., No.* 144, *May-June,* 1930.

*"Sorghum Crops on the High Plains of Oklahoma," Agr. Exp. Sta., Stillwater, Okla., Exp. Sta. Bul.* 191, *June,* 1929, *H. H. Finnell.*

*"Filberts," Agr. Exp. Sta., Corvallis, Ore., Ext. Bul.* 417, *Jan.,* 1930, *C. E. Schuster.*

*"The Corn Contest—*1929," *Agr. Exp. Sta., Clemson College, S. C., Cir.* 102, *Mar.,* 1930, *S. L. Jeffords.*

*"The Sweet Potato Contest—*1929," *Agr. Exp. Sta., Clemson College, S. C., Cir.* 103, *Mar.,* 1930, *R. A. McGinty.*

*"Better Pastures for East Texas," Agr. Exp. Sta., College Station, Tex., C-73, Dec.,* 1929, *E. A. Miller.*

*"Onion Culture," U. S. D. A., Washington, D. C., Farmers' Bul.* 354, *Revised April,* 1930, *W. R. Beattie.*

*"The Production of Peas for Canning," U. S. D. A., Washington, D. C., Farmers' Bul.* 1255, *Revised March,* 1930, *Chester J. Hunn.*

*"Muskmelons," U. S. D. A., Washington, D. C., Farmers' Bul.* 1468, *Revised April,* 1930, *W. R. Beattie.*

*"Variety Tests of Sugarcanes in Louisiana During the Crop Year* 1927-1928," *U. S. D. A., Washington, D. C., Cir.* 88, *Nov.,* 1929, *George Arceneaux and F. D. Stevens.*

*"Department of Agriculture and Immigration of Virginia," Richmond, Va., Bul.* 270, *June,* 1930.

## Economics

Since corn is the major agricultural crop in the United States, many people will be interested in the new Statistical Bulletin No. 28, "Corn Statistics," prepared by the Bureau of Agricultural Economics of the United States Department of Agriculture. The bulletin gives comparable data on production, distribution, and prices of corn. It is one of a series of statistical bulletins prepared by the Division of Statistical and Historical Research, which series is especially valuable in making economic studies of our major agricultural products.

*"The Agricultural Credit Situation in Louisiana," Agr. Exp. Sta., Baton Rouge, La., La. Bul.* 208, *Jan.,* 1930, *R. L. Thompson.*

*"The Cost of Caring For a Bearing Apple Orchard," Agr. Exp. Sta., Columbia, Mo., Cir.* 242, *Mar.,* 1930, *H. W. Guengerich and D. C. Wood.*

*"Types-of-Farming in Oklahoma," Agr. Exp. Sta., Stillwater, Okla., Exp. Sta. Bul.* 181, *June,* 1929, *J. O. Ellsworth and F. F. Elliott.*

*"Successful Farm Management in Kittitas County," State College of Washington, Pullman, Wash., W. O. Passmore.*

*"Considerations in Evaluating Illinois Farm Lands," Agr. Exp. Sta., Urbana, Ill., Cir.* 356, *Nov.,* 1929.

## Diseases

*"Apple Scab and Its Control," Univ. of Mo. College of Agr., Columbia, Mo., Cir.* 243, *March,* 1930, *T. J. Talbert.*

*"Spraying Fruits," Univ. of Mo. College of Agr., Columbia, Mo., Cir.* 245, *Mar.,* 1930, *T. J. Talbert.*

*"Controlling Potato Diseases," Univ. of Mo. College of Agr., Columbia, Mo., Cir.* 246, *Mar.,* 1930, *J. T. Quinn.*

*"Alfalfa Wilt in Nebraska," Agr. Exp. Sta., Lincoln, Nebr., Bul.* 240, *April,* 1930, *George L. Peltier and James H. Jensen.*

*"A Control for Sweet Potato Wilt or Stem Rot," Agr. Exp. Sta., State College Station, Raleigh, N. C., Bul.* 273, *May,* 1930, *R. F. Poole.*

*"A Control for Sweet Potato Scurf," Agr. Exp. Sta., State College Station, Raleigh, N. C., Bul.* 274, *May,* 1930, *R. F. Poole.*

*"Potato Diseases in Montana," Agr. Exp. Sta., Bozeman, Mont., Bul.* 227, *March,* 1930, *H. E. Morris and P. A. Young.*

## Insects

*"Ecological Studies of the Mexican Bean Beetle," Agr. Exp. Sta., Amherst, Mass., Bul.* 261, *Feb.,* 1930, *Harvey L. Sweetman and H. T. Fernald.*

*"Control of Root-knot Nematode in Greenhouses," Agr. Exp. Sta., Wooster, Ohio, Bul.* 451, *April,* 1930, *A. G. Newhall.*

*"Boll Weevil Control," Agr. Exp. Sta., Clemson College, S. C., Cir.* 104, *April,* 1930, *M. H. Brunson.*

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"She's a very nicely-reared girl, don't you think?"

"Yeah. She don't look so bad from in front, either."

# A Mortgage Company Leads the Way

(*From page 25*)

farm must pay its own way, including all improvements. The tenants, after proving their worth, are given an opportunity to buy, on very easy terms, the farm on which they have been living.

The Pioneer Mortgage Company loaned money in southeast Oklahoma and lost, but the loss is only temporary, for after five years of their farm servicing program, their inherited holdings are beginning to pay desirable dividends. Several other mortgage companies are inaugurating this system. Farmers of this section, through observation, are following better farm and home practices. Southeast Oklahoma is to see a better day.

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# Top-dressing Hay Lands

(*From page 28*)

Where potash had been applied, the clover was thicker and practically on a par with the other grasses present. The untreated area was just the opposite, the plants being patchy in growth and not showing the "stretch" and vitality.

Representative areas were selected in each plot and weights made. On the dry weight basis, using Henry & Morrison figures as a standard, the treated area gave a yield of 4¾ tons as compared with 2½ tons per acre on the untreated.

After summing up the test, Mr. Wheeler felt that he could have well afforded to treat all his hay land and received the extra tonnage which spelled the difference between a sufficient and non-sufficient supply of roughage for winter feeding.

It should not be taken for granted that similar results could be obtained on every Rhode Island farm. However, on the lighter soils where the clover does not have the desired vitality or signs of potash starvation are evident, similar tests undoubtedly would prove of value to the farmer.

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# Fertilizing the Kaw Valley

(*From page 27*)

each farm was to take care of variations in the soil of the individual farms.

Table II shows the results of this work. In every case the fertilizers increased the yields. The various analyses acted as they had in previous tests in other years and though these records are for only one year, they bear out the results of the preliminary work done in the past three years so one can rely pretty well on them.

In each case the fertilizer was added at the rate of 500 pounds per acre. Best results were obtained from a 4-8-6 fertilizer. One very interesting thing to note in this table is the fact that the better land, that is, the land that gave the larger yield without fertilizer, gave a bigger increase when fertilizers were used. This bears out the statement expressed by agricultural college men for a number of years: that land whose fertility

has been maintained by the use of cover crops and barnyard manure responds better to fertilizers, or, to put it another way, one can't let a piece of land run down and then expect to bring it back immediately by the use of commercial fertilizers. The commercial fertilizers are the high compression gasoline and unless the motor is a high type of motor and in good condition, there is no use in putting in the higher priced gas.

TABLE II

POTATO FERTILITY TESTS

Conducted by Myron Kelsey, Shawnee county
and
W. R. Stiner, Douglas county, Kansas
Myron Kelsey, Topeka (sandy soil)

| Fertilizer | Cost | No. 1 | Culls | Total | Profit |
|---|---|---|---|---|---|
| 5-10-5 | $11.50 | 28.17 | 30.11 | 78.28 | $13.75 |
| 4- 8-6 | 11.00 | 58.88 | 27.44 | 86.32 | 21.79 |
| No | —.— | 44.16 | 20.37 | 64.53 | —.— |
| 0-14-8 | 9.00 | 48.83 | 26.76 | 72.59 | 8.06 |
| 0-16-0 | 6.75 | 58.64 | 18.74 | 77.38 | 12.85 |
| | W. R. Stiner, Lawrence (sandy silt loam soil) | | | | |
| 5-10-5 | 11.50 | 207.02 | 56.48 | 263.50 | 105.03 |
| 4- 8-6 | 11.00 | 301.13 | 69.74 | 370.87 | 212.40 |
| No | —.— | 120.99 | 37.48 | 158.47 | —.— |
| 0-14-8 | 9.00 | 147.88 | 78.34 | 226.22 | 67.75 |
| 0-16-0 | 6.75 | 185.52 | 97.49 | 283.01 | 124.54 |

All potatoes dug July 9, 1929

# Why Sweet Clover?

(*From page* 22)

seeding mixture, according to many farmers, is one containing sweet clover, red clover, alfalfa, and brome grass. Sweet clover planted on rough land aids greatly in stopping erosion.

Certain swamp lands, especially some in Monona county, have been reclaimed by the use of sweet clover. This reclamation project has been going on for two decades. Sweet clover roots penetrate the soil to a depth of four or five feet and go through hardpan which has held water for years.

# Complete Fertilizers for Apple Trees

(*From page* 19)

letin Number 123, 1916, pages 10 and 11, shows that the foliage and wood of 40 apple trees take up .08 pound of nitrogen, .02 pound of phosphoric acid, and .06 pound of potash the first year after setting out in the orchard; 11.85 pounds of nitrogen, 5.74 pounds of phosphoric acid, and 14.22 pounds of potash the ninth year after setting; and 28.10 pounds of nitrogen, 9.26 pounds of phosphoric acid, and 27.22 pounds of potash for the entire nine years.

Thompson also states that in these nine years 12.84 pounds of nitrogen, 2.53 pounds of phosphoric acid, and 12.97 pounds of potash are returned to the soil by the foliage, leaving a net removal of 15.26 pounds of nitrogen, 6.73 pounds of phosphoric acid and 14.25 pounds of potash. Upon this basis, it is very likely that there is

sufficient fertility in Virginia soils of the Hagerstown and Cecil series, to take care of the phosphatic and potassic needs for normal wood and foliage development in apples.

If the original fertility of these soils is such as to just more than satisfy the needs for wood and foliage development, it might be best to consider only the depletion from the fruit removal and in this way simplify the calculations at least in part. The results of C. A. Brown, secured independently, and his citations of the results of other independent investigations brought out in the Pennsylvania Report of the Department of Agriculture, Part I, 1899, pages 547 and 548 indicate that for every 100 pounds of apples, .059 pound of nitrogen, .027 pound phosphoric acid, and .16 pound potash had been removed from the soil.

### *Safest Guide Is Actual Trials*

To maintain in some degree the original soil fertility for the wood and foliage needs of the apple along with a fertility that is more likely to be capable of maintaining the higher crop yields in so far as nitrogenous, phosphatic, and potassic needs alone are concerned, the analysis of the fruit might be considered. Let us take the amounts and proportions of these elements removed, for example, in 1,000 pounds of fruit. For every 1,000 pounds of fruit removed, .06 pound nitrogen, .16 pound phosphoric acid, and .48 pound potash may be restored. This is in the ratio of 7-2-5 approximately, of ammonia, phosphoric acid, and potash.

An application measured upon this basis should be profitable at least from the standpoint of maintaining available plant food at about the rate that it is removed. This also affords a basis to figure the expense of a definite quantity of fertilizer intended to insure the needs of a definite yield of apples. This suggested ratio should, of course, be modified to meet special conditions. It may be desirable to provide also against the elements tied up in the wood, for removal in pruned wood, and for special cover crop needs.

To provide for such needs also, figured on an ammonia percentage for nitrogen, a 7-6-5 for soils not planted to legumes or low in nitrogen, and a

Table 1.—Timothy hay: Average yield and increase per acre from the use of fertilizer or manure, for the 10-year period, 1918 to 1927*

| Treatment | Amount | Frequency | AIR-DRY HAY PER ACRE | |
|---|---|---|---|---|
| | | | Yield | Increase from treatment |
| | | | *Pounds* | *Pounds* |
| Nitrate of soda | 120 pounds | Annually | 3180 | 793 |
| Superphosphate, 16 per cent | 240 pounds | Annually | 2916 | 571 |
| Nitrate of soda<br>Superphosphate, 16 per cent | 60 pounds<br>120 pounds | Annually | 3227 | 861 |
| Nitrate of soda<br>Superphosphate, 16 per cent | 120 pounds<br>240 pounds | Annually | 3559 | 1091 |
| Nitrate of soda<br>Superphosphate, 16 per cent<br>Muriate of potash | 120 pounds<br>240 pounds<br>80 pounds | Annually | 3731 | 1306 |
| Farm manure | 5 tons | Annually | 3264 | 891 |
| Farm manure | 5 tons | Biennially | 3005 | 617 |
| Farm manure | 10 tons | Biennially | 3093 | 604 |

* Evans, Morgan W., Fertilizing Timothy Meadows with Nitrate of Soda. Bimonthly Bulletin, Ohio Agricultural Experiment Station. Page 45, March-April, 1930.

4-8-5 formula for those planted to legumes, or richer in nitrogen, may be suggested.

While applications based upon the removal and probable depletion of elements may appear to be logical, it is still generally conceded that the safest guide is one based upon actual trials. The individual apple grower will, therefore, do best to rely on trial and error procedure.

On the whole, however, for higher yields and for better quality fruit, applications of phosphoric acid and potash in correct balance with nitrogen must not be overlooked even though applications of nitrogen generally show the more pronounced gains.

Table 2.—Yield of fruit per tree in orchard at Blacksburg, 1918-1928, inclusive. Cultivated—Series I and II, combined—Treated plats compared with nearest checks

| Variety | Plat number | Treatment* | Average yield treated plats | Average yield check plats | Gain | Number of years compared | Student's odds to 1 |
|---|---|---|---|---|---|---|---|
| | | | *Pounds* | *Pounds* | *Pounds* | | |
| Stayman | 2 | N | 199.3 | 129.0 | 70.7 | 8 | 52.36 |
| | 6 | NP | 150.4 | 83.8 | 80.4 | 7 | 19.50 |
| | 7 | NK | 200.9 | 83.8 | 117.1 | 7 | 20.86 |
| | 8 | NPK | 212.1 | 83.8 | 142.1 | 8 | 46.24 |
| Grimes | 2 | N | 123.1 | 103.8 | 19.3 | 6 | 7.90 |
| | 6 | NP | 134.3 | 105.2 | 29.1 | 5 | 12.90 |
| | 7 | NK | 178.7 | 105.2 | 73.5 | 6 | 16.10 |
| | 8 | NPK | 149.8 | 105.2 | 44.6 | 6 | 11.16 |
| York | 2 | N | 178.6 | 188.0 | −9.4 | 7 | 1.52 |
| | 6 | NP | 190.1 | 156.0 | 34.1 | 8 | 3.01 |
| | 7 | NK | 197.1 | 156.0 | 41.1 | 8 | 7.49 |
| | 8 | NPK | 208.7 | 156.0 | 52.7 | 8 | 7.49 |

* N = Nitrogen; P = Phosphoric acid; K = Potash.

Table 3.—Yields of fruit per tree in orchard at Blacksburg, 1918-1928, inclusive. (Sod)—Series III—Treated plats compared with nearest check

| Variety | Plat number | Treatment* | Average yield treated plats | Average yield check plats | Gain | Number of years compared | Student's odds to 1 |
|---|---|---|---|---|---|---|---|
| | | | *Pounds* | *Pounds* | *Pounds* | | |
| Stayman | 2 | N | 116.8 | 21.9 | 94.9 | 6 | 66.10 |
| | 3 | P | 69.2 | 21.9 | 47.3 | 5 | 8.55 |
| | 4 | K | 38.2 | 63.0 | −24.8 | 7 | 33.76 |
| | 6 | NP | 92.7 | 63.0 | 29.7 | 7 | 63.50 |
| | 7 | NK | 98.9 | 63.0 | 35.9 | 8 | 7.80 |
| | 8 | NPK | 141.2 | 63.0 | 78.2 | 8 | 47.80 |
| Grimes | 2 | N | 107.1 | 3.9 | 103.2 | 3 | 15.60 |
| | 3 | P | 46.4 | 3.9 | 42.5 | 4 | 11.00 |
| | 4 | K | 61.3 | 49.3 | 12.0 | 6 | 2.32 |
| | 6 | NP | 79.3 | 49.3 | 30.0 | 5 | 12.06 |
| | 7 | NK | 134.6 | 49.3 | 85.3 | 7 | 63.50 |
| | 8 | NPK | 142.3 | 49.3 | 93.0 | 6 | 85.20 |
| York | 2 | N | 136.7 | 41.2 | 95.5 | 6 | 18.90 |
| | 3 | P | 49.3 | 41.2 | 8.1 | 7 | 3.68 |
| | 4 | K | 36.6 | 56.2 | −19.6 | 7 | 39.20 |
| | 6 | NP | 72.6 | 56.2 | 16.4 | 7 | 7.72 |
| | 7 | NK | 131.9 | 56.2 | 75.7 | 7 | 14.56 |
| | 8 | NPK | 191.3 | 56.2 | 135.1 | 8 | 40.00 |

* N = Nitrogen; P = Phosphoric acid; K = Potash.

Table 4.—Yield of fruit per tree in orchard at Crozet, 1919-1924, inclusive. (Cultivated)—Series I and II, combined—Treated plats compared with nearest checks

| Variety | Plat number | Treatment* | Average yield treated plats | Average yield check plats | Gain | Number of years compared | Student's odds to 1 |
|---|---|---|---|---|---|---|---|
| | | | *Pounds* | *Pounds* | *Pounds* | | |
| Winesap | 2 | N | 102 | 22 | 80 | 5 | 16.20 |
| | 6 | NP | 134 | 38 | 96 | 5 | 21.98 |
| | 7 | NK | 97 | 40 | 57 | 5 | 7.15 |
| | 8 | NPK | 140 | 38 | 102 | 5 | 17.00 |
| York | 2 | N | 82 | 52 | 30 | 5 | 6.94 |
| | 6 | NP | 83 | 50 | 33 | 5 | 13.30 |
| | 7 | NK | 85 | 50 | 35 | 5 | 9.82 |
| | 8 | NPK | 74 | 50 | 24 | 5 | 6.38 |
| Stayman | 2 | N | 102 | 47 | 55 | 5 | 4.47 |
| | 6 | NP | 106 | 54 | 52 | 5 | 4.47 |
| | 7 | NK | 103 | 37 | 66 | 5 | 7.55 |
| | 8 | NPK | 133 | 54 | 79 | 5 | 7.95 |

* N = Nitrogen; P = Phosphoric acid; K = Potash.

Table 5.—Yield of fruit per tree in orchard at Crozet, 1919-1924, inclusive. (Sod)—Series III—Treated plats compared with nearest checks

| Variety | Plat number | Treatment* | Average yield treated plats | Average yield check plats | Gain | Number of years compared | Student's odds to 1 |
|---|---|---|---|---|---|---|---|
| | | | *Pounds* | *Pounds* | *Pounds* | | |
| Winesap | 2 | N | 61 | 5 | 56 | 5 | 14.60 |
| | 3 | P | 5 | 19 | −14 | 5 | 80.54 |
| | 4 | K | 1 | 5 | −4 | 5 | 2499.00 |
| | 6 | NP | 98 | 19 | 79 | 5 | 15.40 |
| | 7 | NK | 77 | 19 | 58 | 5 | 14.20 |
| | 8 | NPK | 68 | 19 | 49 | 5 | 17.00 |
| York | 2 | N | 48 | 9 | 39 | 5 | 7.75 |
| | 3 | P | 8 | 6 | 2 | 4 | 3.69 |
| | 4 | K | 23 | 9 | 14 | 5 | 8.55 |
| | 6 | NP | 118 | 6 | 112 | 4 | 12.10 |
| | 7 | NK | 39 | 6 | 33 | 5 | 7.95 |
| | 8 | NPK | 50 | 6 | 44 | 5 | 25.30 |
| Stayman | 2 | N | 52 | 29 | 23 | 3 | 5.99 |
| | 3 | P | 10 | 5 | 5 | 5 | 4.47 |
| | 4 | K | 11 | 29 | −18 | 4 | 8.71 |
| | 6 | NP | 116 | 5 | 111 | 5 | 9.06 |
| | 7 | NK | 61 | 5 | 56 | 5 | 8.80 |
| | 8 | NPK | 60 | 5 | 55 | 5 | 15.80 |

* N = Nitrogen; P = Phosphoric acid; K = Potash.

Table 6.—Yield of fruit per tree, Melvin Green apple orchard, 1914-1920, inclusive. Cultivated treated plats compared with check plats

| Variety | Treatment* | Average yield treated | Average yield check | Gain | Number of years compared | Student's odds to 1 |
|---|---|---|---|---|---|---|
| | | *Pounds* | *Pounds* | *Pounds* | | |
| York | N | 494 | 496 | −2.0 | 6 | 0.00 |
| | NP | 636 | 496 | 140.0 | 6 | 8.62 |
| | NK | 674 | 496 | 178.0 | 6 | 5.54 |
| | NPK | 654 | 496 | 158.0 | 6 | 8.38 |

* N = Nitrogen; P = Phosphoric acid; K = Potash.

Table 7.—Combined yields of apple trees in cultivation—treated plats compared with untreated plats

| *Fertilizer combination compared | Average yield in pounds for treatment | Average yield in pounds for check | Gain in pounds for treatment | Number of years compared | Student's odds to 1 |
|---|---|---|---|---|---|
| YORK—From Blacksburg, Crozet, and Green Orchards, Virginia; Sleepy Creek Experiment, West Virginia; and Projects 215 and 216, Pennsylvania | | | | | |
| N with C | 222 | 238 | −16 | 20 | 3.56 |
| NP with C | 218 | 214 | 4 | 20 | 4.4 |
| NK with C | 259 | 223 | 36 | 21 | 102.3 |
| NPK with C | 267 | 173 | 94 | 21 | 9999.0 |
| GRIMES—From Blacksburg, Virginia, and Sleepy Creek Experiment, West Virginia | | | | | |
| N with C | 124 | 102 | 22 | 12 | 93.44 |
| NP with C | 108 | 101 | 7 | 12 | 2.06 |
| NK with C | 117 | 101 | 16 | 12 | 3.48 |
| NPK with C | 115 | 101 | 14 | 12 | 2.84 |
| STAYMAN—From Blacksburg and Crozet, Virginia, and Projects 215 and 216, Pennsylvania | | | | | |
| N with C | 192 | 137 | 55 | 20 | 54.58 |
| NP with C | 181 | 183 | −2 | 19 | 0.0 |
| NK with C | 246 | 152 | 94 | 18 | 195.0 |
| NPK with C | 240 | 167 | 73 | 19 | 28.0 |
| WINESAP—From Blacksburg and Crozet, Virginia | | | | | |
| N with C | 111 | 45 | 66 | 10 | 13.06 |
| NP with C | 137 | 49 | 88 | 10 | 29.8 |
| NK with C | 162 | 49 | 113 | 9 | 31.58 |
| NPK with C | 160 | 49 | 111 | 10 | 81.0 |
| BEN DAVIS—From Sleepy Creek Experiment, West Virginia, and Round Hill Orchard, Virginia | | | | | |
| N with C | 201 | 134 | 67 | 15 | 21.78 |
| NP with C | 109 | 59 | 50 | 11 | 44.22 |
| NK with C | 124 | 50 | 74 | 11 | 138.0 |
| NPK with C | 147 | 50 | 97 | 11 | 527.2 |
| ROME BEAUTY—From New York Experiment Station, New York, and from St. Mary's Experiment, West Virginia | | | | | |
| NPK with C | 413 | 343 | 70 | 24 | Infinity |
| BALDWIN—From New York and Pennsylvania | | | | | |
| NPK with C | 552 | 573 | −21 | 10 | 1.7 |
| YORK, GRIMES, STAYMAN, WINESAP and BEN DAVIS—From Blacksburg, Crozet, and Round Hill, Virginia; and Pennsylvania | | | | | |
| N with C | 170 | 141 | 29 | 21 | 39.66 |
| NP with C | 157 | 143 | 14 | 20 | 4.08 |
| NK with C | 195 | 135 | 60 | 20 | 752.4 |
| NPK with C | 184 | 124 | 60 | 20 | 311.6 |
| YORK, GRIMES, STAYMAN, WINESAP, BEN DAVIS, ROME BEAUTY, BALDWIN and JONATHAN —From Virginia, West Virginia, Pennsylvania, and New York | | | | | |
| N with C | 261 | 214 | 47 | 21 | 1356.4 |
| NP with C | 236 | 197 | 39 | 21 | 67.4 |
| NK with C | 232 | 168 | 64 | 21 | 1356.4 |
| NPK with C | 275 | 215 | 60 | 25 | Infinity |

* N = Nitrogen; P = Phosphoric acid; K = Potash; C = Check or untreated

In dealing with data, it is important to consider the probable effects of factors other than the one introduced. The effects of these uncontrollable factors are referred to as chance variations, and as such, introduce the probability of error which must be taken into account to interpret differences between two groups of measurements. Statistically, the true difference between two groups of data cannot be correctly interpreted without allowing for the chance variation in each group. Averages or means in themselves are not sufficient to establish clear cut differences. A computation known as the standard deviation which expresses the absolute degree of variation must also be calculated. With the standard deviation known, the true difference between two groups of observations may be ascertained inasmuch as the odds against chance or random variation as probably causing this difference can then be determined.

Student's method may be used to compute such odds. In this method the mean differences between

each pair of items in two groups are secured. This mean of the differences is divided by the standard deviation of the mean difference. This quotient referred to as Z in Student's tables gives the odds against chance variation. Odds of 30 to 1 are generally accepted as significant or that the difference secured is against chance variations and, therefore, can be attributed to the treatment introduced. Under conditions of perfect control it would be fairly easy to determine the difference between a pair of items when both are absolutely identical except for the treatment introduced. Such a condition of control is not always possible. If, however, the items of a pair are fairly alike even though the conditions of each pair are not altogether similar, the difference between each pair of items in each of the different situations can still be used to secure a mean or average difference. In this investigation the difference between two items was secured by pairing over a period of several years.

# Putting "Pep" into Farming

(*From page* 23)

Some of these contests staged between the leading farmers of a State have been unusually productive of results. A study of the tabulations made of the methods used by the men who make a success of any one of the clubs is perhaps the best source of information any farmer can find on the particular phase of agriculture covered by the contest.

For example nearly every State has a 300 or a 400-bushel potato club. While the potato production of any particular State may be 100 bushels per acre, the men who succeed in such a contest often secure average yields of 350 and in some cases much larger average returns. The things these men did are matters of record open to every farmer. If he is interested, he can learn how it should be done. A yield of 500 bushels per acre is not an accident, for the same man repeats year after year with crops averaging far above the ordinary yield for his section of the State.

A potato producer in Colorado found a part of his commercial planting producing at the rate of 1,047.4 bushels per acre. The field had received no special care except that given to his entire acreage. Yet the measured acre produced 1,047.4 bushels per acre. A Pennsylvania grower has an official yield of about 700 bushels per acre.

Another very successful contest for farmers is staged annually by Purdue University. The State of Indiana produces thousands of acres of tomatoes for the canning factory. State average yields vary widely. Some seasons the figure is three and one-half tons per acre. In good years it is four, and in real good years it may go higher. A ten-ton yield is very unusual, and so the club is called "The Ten Ton Plus Tomato Club."

In 1925 twenty-nine men produced ten tons or more per acre on a three-acre field. There were 223 men who tried that year. In the canning factory districts represented, six of the clubs produced average yields double those of the non-club growers. Year after year the club members have an average tonnage per acre far in excess of the State average for the season. One hundred per cent gains are very common.

These contests carry with them the possibility of being recognized as the champion grower of some particular crop for the entire State. Prizes of various kinds are awarded. In Ohio the 400-bushel Potato Club men are recognized by the gold watch charms they receive. The tomato men of Indiana wear medals bearing a tomato in relief.

In addition to the medal, the leaders of this Indiana club receive gold watches. And so through the office of the county agent, the farmer learns of the possibility of becoming the potato king or the champion corn grower of his particular State. Competition in farming as in other business, leads to improved practices which in farming means bigger yields with lower costs per unit. It is a constant struggle, and this spirit of play helps make the game of working the soil more attractive.

# The Inquiring Mind

(*From page* 14)

bugs. The true naturalist studies all impartially, treasures all alike, and discovers wonders in the lowliest forms. Yes, Lad, the closer I look into the little things and the better I become acquainted with the intricate mechanism and structure of microscopic objects, the nearer I get to the God of the universe and a full appreciation of the Divine origin and control of everything in Nature."

Under the good Doctor's direction I collected, classified, and named 42 different beetles that morning, and today I have the note-book in which their Latin names were jotted down. But it is not the finding of those insects, or the particulars I learned about each, that I treasure in memory. It is the *man* I remember best —the inspiration he was to me, the clearness and cleanness of his discourse, his leadership and belief and faith in the omniscience and omnipotence of the Supreme Being.

Would that there were today more scientists of his caliber and character to guide and inspire our students!

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# Graded Tomatoes

(*From page* 10)

14. Eliminates some factory equipment. Some of the old, rough types of machinery whose chief function was to shake out the rotten tomatoes is not needed.

15. Provides an incentive for good growers to do better as they get paid for the better tomatoes delivered.

16. Provides a cause for better production methods. Since growers can get their own price depending on quality produced, they can afford to use better cultural methods in producing the crop.

17. Over a period of years with definite quality raw stock canners can determine what can be packed from No. 1's, 2's, and cost, so he will be able to sell with more knowledge. A study of the differential in price to be paid between No .1's and No. 2's will enable canner to establish an equitable price.

18. Gives individual packer and canners as a whole a selling and advertising point worth while. To have the government standing back of quality put into the can is good advertising point to place before consumers.

A few testimonials from users might be of value in indicating what canners think of the grading system:

"When buying tomatoes on a graded system was first talked of, we were dead against it. We followed it and studied it. In 1929 we used it, and one year has convinced us of its merits—of its fairness to both grower and canner. We now are as radically for it as we were against it."

"We expect to use it at all of our factories next year (1930)."

"We have been with the grading system of buying raw stock since its inception and are firmly of the opinion that it is the only equitable way to purchase tomatoes. We will use it at all of our factories in 1930."

"The grading system works more successfully than we ever dreamed of. We expect to use it at all of our plants in 1930. Our tomatoes were delivered better, with less culls, and more red-ripe tomatoes than ever before."

"Last year was our first experience with the graded system of buying. We didn't have a single dissatisfied farmer in the whole bunch. We will buy on the graded basis in 1930."

"We were very well pleased with the grading system at our factory. We believe it is the only honest way to buy tomatoes as the grower is paid for just the quality of tomatoes he delivers. It is not like buying on the flat rate where the fellow that brings in bad tomatoes gets as much as the one bringing in good ones. We're using the grading method in 1930."

"We would not want to go back to the old way of buying tomatoes."

Canners, it would seem, are enthusiastic about it. The growers, too, are for it. Canners report that 90 per cent of their farmers are in favor of it and that contracting on the basis of the grade is easier than on the old flat rate. With the buying on the grade firmly being fixed in Indiana and its spread to other tomato sections, growers must strive to grow higher yields and obtain a higher percentage of No. 1's. This can only be brought about by the use of better soil, more liberal applications of high-grade complete fertilizers, and careful culture throughout the growing and harvesting period.

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# Pastures for the South

(*From page 7*)

make room for cotton fields that will likely meet a similar fate, little realizing that in the course of years, after the native forests have been so rapidly and ruthlessly destroyed, timber will make more net income than we have reason to expect from cotton or any other cultivated crop.

The sooner we learn with the German that it is not the broad acres that count, but the utilization of each acre in the way that nature and the peculiar environment suggests, the sooner will we cease to be miners of soils and come to be manufacturers of farm crops. The German's definition of a good soil is a good place to put fertilizers, and very few acres are so poor that they may not be made, with fertilizers, to produce profitably. This is predicated, however, on the assumption that the fertilizers so placed remain to feed the crops and are not washed down near-by streams.

The secret of the German's success no doubt lies in the fact that he does use fertilizers liberally, for the experiment stations are telling us that money so invested returns itself many times each season. Certainly, the secret of the success of those who have intelligently utilized their lands for pasture and livestock is closely connected with the fact that under such a system they have kept the natural fertility of the soil intact, at least adding to it the plant food contained in the feeds used to supplement such pastures, granting they have applied no fertilizer at all.

It is fast being realized that fertilizer used on pastures pays as well as that applied to cultivated crops. A study of the permanent pastures of England reveals the fact that some of them are 200 to 300 years old, and that they are fertilized as liberally as the best of our cotton lands, though in a little different way. There the fertilizers are applied every three years, rather than annually as with us, and the custom is to add triennially 1,200 pounds of basic slag and 1,000 pounds of kainit, with manure at any time it is available, and light applications of sulphate of ammonia annually. The prevailing grasses are rye grass, fescues, and clover, and they carry an average of from one-half to three and one-half cows per acre.

Certainly, if the owners of the high-priced lands of England can afford for all these years to grow only grass, we might with greater profit do the same on the much cheaper lands of the South. One wonders if the agricultural history of England may not have had its influence on the gentleman above referred to. He was a Princeton graduate and quite capable of being guided by a very broad perspective.

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# Potato Profits

(*From page 6*)

gives the average total yield and the increases due to fertilizer over plots receiving manure only.

Table II

| | Total Yield | % No. 1's | Increase No. 1's over manure |
|---|---|---|---|
| Manure only | 202.25 Bu. | 85.2% | |
| Manure 800 lbs. 5-8-7 | 286.13 " | 86.7% | 76.10 |
| " 400 lbs. 10-16-14 | 280.11 " | 87.2% | 72.60 |
| Manure 800 lbs. 3-12-12 | 300.20 " | 88.4% | 92.80 |
| " 400 lbs. 6-24-24 | 307.26 " | 88.7% | 100.40 |
| Manure 800 lbs. 3-9-18 | 306.06 " | 89.6% | 101.70 |
| " 400 lbs. 6-18-36 | 307.13 " | 90.6% | 106.30 |
| Manure 800 lbs. 3-20-20 | 329.03 " | 89.9% | 123.30 |

All the plots received approximately 10 tons of manure either directly for the potatoes, or on the hay crop the year previously. Each of the treatments produced profitable increases over the "manure only" treatment. The margin of profit was especially good since the crop was marketed at prices ranging from $1.75 to $2.00 per cwt., for U. S. No. 1's. The season, also, was a favorable one for good yields. Even with an average price for potatoes, investment in fertilizer would have proven profitable.

The results in 1929 confirm those obtained in past years in that mixtures containing about 3 per cent of nitrogen and 12-20 per cent of potash have not only given the higher yields, but also better quality of potatoes than the old standard potato fertilizer represented by such mixtures as 5-8-7 and 4-8-6.

In this connection it might be interesting also to refer to results obtained on the sandy section representing the oldest, and largest producing area in Wisconsin. In the April issue of BETTER CROPS WITH PLANT FOOD Mr. H. G. Frost reported the work with the use of fertilizers on sandy soils. His data also indicated that mixtures similar to a 3-10-20 were found to be most satisfactory.

The trend during the last few years is distinctly in the direction of higher potash and lower nitrogen fertilizers. In 1929 approximately 20 per cent of the total fertilizer tonnage, or about 8,000 tons, were used on the potato crop. Roughly two-thirds of it consist of the higher potash-phosphate mixtures similar to those referred to in Table II.

Wisconsin growers have made advances in another direction that affects not only economy in fertilizer costs, but also economy in labor of handling. That is through the use of higher concentrated mixtures. The productions of synthetic nitrogen products, treble superphosphate, and high analysis potash have made it possible to double and even treble the concentration of ordinary strength fertilizers. The tests conducted in three different sections have shown that equally good yields may be obtained with the high concentrations as compared to the ordinary fertilizing material where identical amounts of plant food are applied.

By referring to Table II again, it will be noted that three fertilizers, the 5-8-7, the 3-12-12, and the 3-9-18, were used at the rate of 800 lbs. per acre applied in the row and 400 lbs. per acre where the double strength mixtures were employed. These double strength goods gave a good account of themselves. In the case of the 10-16-14 the year's results were somewhat below that secured with the single strength materials while with the other two mixtures somewhat higher yields resulted with the double as compared with the single strength materials. In no case, however, are the differences very significant.

These results were obtained on silt loam soil, and the fertilizers were applied in such a manner as to insure good distribution in the soil. In experimental work fertilizers must necessarily be applied by hand in order to insure accuracy as to amounts used. In this connection, however, it might be stated that one of the large growers in Langlade county fertilized a considerable acreage with a double 3-9-18 using a modern make of planter. Uniformly good results were obtained. In none of the test plots was any germination injury due to the use of high concentrations noted at any time.

Good distribution in the soil is important, and it is gratifying to note that implement manufacturers are improving the distributing apparatus so that uniform application and fairly accurate calibration are possible. On the heavy silt loam soils the danger of germination injury appears relatively small where the fertilizer is distributed uniformly in the soil. On the lighter soil type, especially in dry seasons, the matter of distribution is of more importance.

Potato growers are interested in these high concentrations for two reasons, first, the unit cost of plant food is less, and second, the labor of trucking and handling fertilizers is reduced about 50 per cent. These are factors that are considered by the fertilizer industry as of vital importance. In fact manufacturers anticipate the more general use of high analysis mixtures. In Wisconsin four companies are licensing goods some of which are one and one-half or double the concentration of the usual grade listed in past years. A few of these selected at random are, as follows: 6-24-24, 6-18-35, 8-16-14, 4-24-12, 4-30-8.

Some one in jest has referred to these high analysis fertilizers as "left-handed" mixtures. Farmers, however, will think of them as "right-handed" materials in raising tubers more profitably.

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# In Czechoslovakia

(*From page* 43)

what portions might be retained by the owner. It also had to supervise the management of the estates which would be expropriated but had not yet been taken over.

The Land Office was to decide

about a particular request on the part of an estate owner to be allowed to transfer, rent, mortgage, or divide his land. It was to determine the price to be paid for the land, on the basis of principles to be laid down by a special law. It was to distribute the expropriated land, and to decide to whom the land should be given in lease, and to draft the necessary legal documents.

The Land Office also was to provide the necessary equipment and stock for the portions distributed. It arranged the terms of credit for those who received the portions. Its work was to be supervised by the committee of twelve chosen by the National Assembly for a period of three years. The land might be given either to individuals or to cooperative societies. Expropriated industrial plants might be given to associations whose prime object was the carrying on of rural industries.

One of the most difficult questions to settle was the question of compensation to be paid for the expropriated land. It was demanded by the owners of the large estates that the price should be equal to the price of land on the open market. On the other hand, those who expected to receive the land on a long-term credit would have to pay for it in a distant future when the value of the currency would probably rise near to or to its normal level. It was even proposed that some of the land should be expropriated without any compensation since it was land originally confiscated from the native nobility without any compensation. Moreover, a large part of the land at the time of its expropriation belonged to the people hostile to the Republic. Finally it was decided that a compensation should be paid for all the expropriated land. The amount to be paid was based on the average price in the open market in the years 1913-15. The area of the land to be expropriated was estimated at around 10,000,000 acres.

One of the aims of the land reform was to bring a larger number of population back to agriculture. It was known that small farming establishments employ two or three-times as many persons per unit area as large establishments. Agricultural production was expected to increase, due to more intensive cultivation of soil on smaller farms. This was accomplished to a certain extent. According to the data compiled by Dr. A. Prokes, and published in the Annals of American Academy in March 1929, the production of winter wheat per acre increased 52 per cent between 1920 and 1928, that of spring wheat 48 per cent, of rye 65, barley 54, oats 58, potatoes 59, and sugar beets 21 per cent for the same period. The increase in the number of livestock for the same period was largest in hogs, in this case being 24 per cent. Increase in the number of horses was 20 per cent, and in the number of cattle seven per cent, between 1920 and 1928.

### *Stimulated Interest*

The land reform greatly stimulated the interest of farmers in the improvement of their methods. The fields of each of the small farms, which had been divided into narrow strips, each farmer owning as many as 15 of them, were not practical to take care of. They made particularly difficult the use of labor-saving machinery.

In order to remedy this condition, many communities conducted a survey of all their land and divided it into a smaller number of larger fields better adapted to an efficient cultivation. By this arrangement each farmer could obtain all his land in three or four lots. This adjustment was called commassation. The advantages of it are that it increases the area of productive soil and makes possible its improvement. It also facilitates the use of machinery, thus saving time and labor connected with the cultivation of soil.

In Czechoslovakia, the barns and homes are usually close together as shown by this typical farmstead on a large farm. The house is on the right, barn on the left.

The land reform is closely connected with the program of rural education. The need of raising the standard of education was felt particularly in the eastern territory which had been taken over from the former Hungary. In 1910 Austria had 16.5 per cent and Hungary 25.4 per cent illiterates. The Czechoslovak territory had 7.9 per cent. According to the statistics of 1921 the Czechoslovak territory had only 7.02 per cent illiterates. Among various nationalities of the country, Czechs had 2.27 per cent, Germans 2.46 per cent, Poles 6.1 per cent, Magyars 10.64 per cent, Slovaks 16.01 per cent, and Russians 60.97 per cent illiterates.

The country has a law providing that every community has a public library which should be equipped according to the size and wealth of the community. "Sokol," a national organization for physical development of its members has members in every community. In every community where there is a sufficient membership, a local unit is formed, including both men and women. A systematic physical training is carried on in a gymnasium provided for that purpose from the dues of local members and by some support of the national.

This organization has a particularly strong influence upon the growing generation. It is one of the organization's aims to direct the interest of its members to the ideals of universal brotherhood and social usefulness.

The main purpose of the land reform in Czechoslovakia was to give the land into ownership of the people who cultivated it. This meant an increase of the relatively conservative rural class. It also meant an additional employment for a large number of people who would become unemployed industrial workers should the large estates remain to be cultivated on a large scale, more extensively, and with the utmost use of labor-saving machinery.

The division of the land brought about a more intensive farming which is suitable rather to small than to large farms. It increased the yield per acre of land, and the area of land devoted to crops which bring a high monetary return but require a large amount of human labor. The increased yield per acre was particularly appreciated during the years of food shortage following the World War, when the country aimed for self-sufficiency in food supply.

In the last few years, however, the farmers of that country have had to face the keen competition of the countries of a more decidedly agricultural type. The increasing imports of cheap foodstuffs from abroad threaten

to lower prices to the level where farming on a small scale becomes unprofitable. The value of the land gradually decreases and a farmer is more and more in danger of being unable to leave the occupation which means to him heavy work with small return.

# Weeds

(*From page* 4)

let the weeds hang themselves.

How nice and comfortable it is to sit down and listen to a weed lecture in winter. Those charts make everything so simple and convincing. You forget that the underground rootstocks and the horny little seeds out in the ground are able to withstand more zero weather than Admiral Byrd and not grow whiskers either. I have seen more plausible arguments against weeds accepted in January and forgotten in June than there are sow thistles in Minnesota.

Here again we face the old Adam in all of us—ready to applaud and adopt resolutions in the easy chair and slow to push them with the plow. Yet I would not for the world deter a single minister of weed salvation from churching us regularly on the topic. We need it. So do the weeds.

They begin by telling us that the first trench battle line is to learn to know the weeds. We can't possibly exterminate anything until we determine it, identify it, and classify it. I have found it a rare help to be able to know my plant boarders by name and catch their looks of gratitude as I spread them around by raking and mowing.

Few ordinary untaught scribes are better versed in the nomenclature of weedology than I am, as I have sat through many lectures and scanned many nature leaflets. Yet it is a rude jar when I find a farmer friend of mine who does not know Amaranthus retroflexus from Plantago lanceolata, and still harvests forty-five bushels of plump wheat an acre without dockage.

Sometimes they try to hang it on the seedsmen. Often they deserve it when they peddle screenings under bargain prices, so that unsuspecting customers jump to the bait and think they have a sinecure when they sow three acres of alfalfa seed purchased for five dollars and ten cents.

But out in my state of Illisconsin only fifteen per cent of all the field seeds put into the crop land come from reliable sources. The bulk of it is bought or traded with neighbors. This is not a reflection on neighbors, because a good neighbor usually donates all of the best he has and neither expects questions nor answers them. This should teach us the fallacy of trying to find the soundness of a gift horse by looking into his mouth. Better go around behind and see how swift he can kick.

Fanning mills are probably no more popular muscle developers than grindstones, which is one reason for so many bright yellow grain fields. Besides, farmers prefer working in the fresh air behind the cultivator to a stuffy indoor job with the sieves and shakers. Then

again it's real nice to have your landscape assume the shade of an oriental rug.

By the way, one of the best accidental rock gardens I ever saw was where Neighbor Smithers upset his wagon-box full of grain near a gravel pit. The painstaking art of man in floriculture becomes a feeble gesture beside the natural vigor of untamed plant life. Whenever animate life of any kind is chased by foes and harassed by enemies there seems to spring up within it a silent reservoir of power, a will to live and multiply. Hence our weed neighbors have gained power through being pariahs. (Some folks are like that.)

One of the ingenious definitions of agriculture seen lately was the phrase of the Bishop of Newcastle, who stated that agriculture was a "controversy with weeds." Agricultural science has taken great pains to scour the earth and breed up specimens of the most abundant strains of grain and corn. Nobody has done much to pedigree the weeds or lend them a hand in the struggle, but somehow they seem to lay hold of the survival of the fittest doctrine and each year sees a more vigorous and determined species of arrogant invaders. The ragged old buffalo and the gaunt timber wolf are hardier and tougher than the best kept cattle and the hand-fed dog.

If farmers were to strike for a couple of seasons, science would have to get busy and make human food out of weeds and wild roots. The fear of weeds on abandoned farms has saved the skins of many farmers with delinquent mortgages, especially where the banks held the title. The banks say "better keep a losing farmer on the land than accept a weed ridden liability."

Negative virtues, however, do not endear one to weeds. 'Tis true also that weeds may sometimes help to retain nitrates in the soil on land that runs fallow, and weeds are useful as green manure for plowing under. Possibly their best advantage, if it might be called such, lies in the fact that weeds make good tillage methods necessary. They drive mankind to invent and apply tools and implements with which to uproot the undesirables, and they sometimes keep him so busy that he forgets to worry about himself.

I would not spend so much time analyzing the virtues and advantages of weeds were it not for the belief that we must prepare to live with them for some time to come, willy-nilly. Just as we try to hunt the best spots in our neighbor's folly, so must we take our weed companions with a plentiful pinch of philosophy—along with the pitchfork.

TAKE a glance at our new-found boon companion of the hay field and pasture—sweet clover. When I was a stub-toed kid, this plant was just a tramp along roadsides and railroad banks. Farmers prized their timothy and Johnson grass, but chortled if anyone mentioned possible values in sweet clover. But that was before the county agents raved about what my German friend calls "noodles" on the legume root hairs. That was prior to nitrogen fixation, and bacteria cultures had not gained credence.

Other instances might be recorded had we the space. Spurrey, a common weed, is used as a fodder crop in Belgium. You and I have gleaned thousands of dandelion plants for greens and other more ulterior purposes. Chicory, that blazing star flowered plant of blue, has been used as a coffee substitute. They tell me, and I accept it among other amazing things, that quack grass roots are cooked for food in Italy. Possibly the vermicelli crop has run short there. If Mussolini likes quack root salad I could contract with his steward for all he needs. When I take on this assignment you won't be bothered with further essays.

Bees treat the flowering weeds just as impartially as the rain treats

them, using no agricultural judgment whatever. They like fire-weed, and I like the nectar they get from it. Grandmother's old-fashioned garden held many posies that became aristocrats from lowly lineage. Cornflowers, poppies, asters, and the scarlet pimpernel testify to the truth that even a member of the weed tribe can make its inherent beauty so keenly appreciated that its naughty habits are overlooked.

Cooking herbs and medicinal plants have played no small part in the "humanics" of America. Tansy, pennyroyal, sage, lavender, coriander, marjoram, savory, and balm. They haunt us from old rafters and shake their dust at us from old attics. Old gentlemen with excellent memories acquire boyish agility again at mention of certain brews and nostrums, so they may run fast and far to escape their potency.

So apparently a weed is after all a plant out of its proper place, but who is to know with absolute truth what *is* its proper place? True, we know for a certainty where it should *not* be if its presence interferes with plans we have hatched the winter before.

There is a direct relationship between oxygen-using man and carbon-using plants, and they tell me that we belong to the same brotherhood of living things depending upon the sun and the earth for our existence. I have no doubt that a farm covered with plants which we list as weeds might indeed contribute just as successfully to that part of the scheme as almost any agricultural growth.

But man has decided that he must eat flesh of livestock, and livestock prefer agricultural plants to most weeds. If we were vegetarians entirely, I believe the most of us would reject alfalfa for some of the plants we carry on the black list.

I would fain correct a false term used by many of us in our summer campaigns. We talk glibly of weed "eradication." This should be somewhat qualified. The term should be weed "limitation." Handling weeds is no job for the amateur. A chap who manages to snipe a few pests out of his lawn cannot afford to drive countryward and sneer at the embattled farmer. While he is snickering and deriding, the sparrows are toting more chickweed seeds onto his unprotected greensward. He who laughs last on the weed question is wiser, but he who never laughs is wisest of all.

THERE are as many copper-riveted and automatic, self-adjusted plans proposed for weed control as there are policies advanced to settle the prohibition question. Let a writer who wants to tackle a controversial subject come to me for a tip. I would spread out a time-worn and time-tried list for him to select. Liquor regulation, raising babies, more service for less taxes, farm relief, and weed control—these five would uncover more prejudice and personal opinion than one writer could handle in a month of Sundays.

It would be hopeless. He would

find radicals willing to declare that we need and demand liquor, babies, taxes, farm relief, and weeds as well. Others would exterminate them all, and no two would agree either on how to raise them best or how to kill them off the quickest. So it all depends on the point of view, and as we are gaining population and viewpoints equally fast here in America, I do not wish to add my mite to the multitude.

As long as a thing is active enough to get talked about so much, it surely must command respect for its virility at any rate. So weeds cannot escape a lasting niche in our hall of fame, if for no other reason than they give us something to do and something to wrangle about.

For this reason my own personal experiences in trying to subdue the encroaching plant enemies of my beets and cucumbers need not concern you. Neither shall I foist upon you any recommendations in categorical order, gleaned from the studies of any experimental farm. Your own library will prove how unworkable some of them are anyhow.

BUT this outstanding truth I *do* know. Weed control is best accomplished through community action, just like any other reform that man feels is justified. One lorn farmer attempting to push back the weed lines in a lousy neighborhood deserves credit for idealism, but he hoes and hopes in vain.

Where weeds spell reduced cash crop returns or the presence of foreign matter lowers the grain income, it is simpler to get a few planks nailed into an anti-weed platform; but where the weeds merely go into a hay and forage crop or into feed grain, the job of arousing action is difficult.

Of course some farmers dislike weedy fields just as their wives hate dirty floors, and it does not require a cash balance sheet to open their eyes to community action. But as a rule such zealous souls die young because of their crusading labors, leaving the land once more to the mercy of the Huns of herbage.

In closing out my monthly stock this time, I would mention the relation between misplaced plants and misfits in human endeavor. While both are somewhat similar in character, they differ much. A man out of place is like a fish out of water. A plant out of place seems to grow fully as well as in its ordained spot. A man seldom grows in personality or stamina when out of his rightful place. A plant will wax and grow fat in spots not intended for it, so long as the soil favors it.

Therein lies another truth. Foundations for both man and plant begin with the soil and the environment. When we make better a community in which all humanity lives and thrives to best advantage, we favor the growth of the best that is in mankind. Of course, we likewise give scope to the man with weak instincts or bad intentions. We take it for granted that the better environment we provide will encourage the best that lies in man's soul and spirit. We do not hesitate to provide that better environment just because a few misfits or morons also may take advantage of it.

So it is with plants. Your complete formula of drilled fertilizer or stable manure will benefit the mustard and the dodder while it is invigorating the wheat and the clover. Yet he who would withhold any nutrient from the land simply for that reason is mistaken—unless his crop is *mostly* trash.

Hence it appears that our best line of attack against tares in man or land is to use the best seed of the cleanest kind to start with, plus a high degree of environment and fertility. This system may save us a lot of sweat and swear words. But neither seed, environment, nor fertility will save us from work. So let's get back to it!

### A LITTLE MISTAKE

"As I was crossing the bridge the other day," said an Irishman, "I met Pat O'Brien. 'O'Brien,' says I, 'how are you?' 'Pretty well, thank you, Brady,' says he. 'Brady,' says I, 'that's not my name.' 'Faith,' says he, 'and mine's not O'Brien.'

"With that we again looked at each other, an' sure enough it was naither of us."

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*Smith*: "My wife used to play the piano and sing a great deal before the children came."

*Brown*: "Children are such a comfort."

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St. Peter's: "Who's there?"

Voice Outside: "It is I."

St. Peter (peeved): "Get outta here; we don't want any more school teachers."—*Arizona Kitty-Kat.*

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### TAKING NO CHANCES

Negro Undertaker (over telephone): "Rastus, your mother-in-law just died."

Rastus: "Is you sure 'bout dat?"

N. U.: "Shall I bury her or embalm her?"

Rastus: "Don't let's take no chances, brother. Cremate her!"

—*V. P. I. Skipper.*

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Passenger: "Have I time to say goodbye to my wife?"

Conductor: "I don't know, sir, how long have you been married?"

### POOR KID

Papoose: "Baw-w-w-w, I wanna drink."

Eskimo Mother: "Shut up, it's only six months till morning."

—*Illinois Siren.*

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A good story is told in which an Englishman asked an American what was done, in the United States, with the surplus of the tomato crop. The American replied, "We eat what we can and we can what we can't." The reply pleased the Englishman so much that on his arrival home he availed himself of the first opportunity to repeat it, but in telling the story wound up with "We eat what we can and what we can't we tin!"

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You can never tell. Probably a fish goes home and lies about the size of the bait he stole.

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A young bride walked into a drug store and approached a clerk timidly.

"The baby tonic you advertise—" she began—"does it really make babies bigger and stronger?"

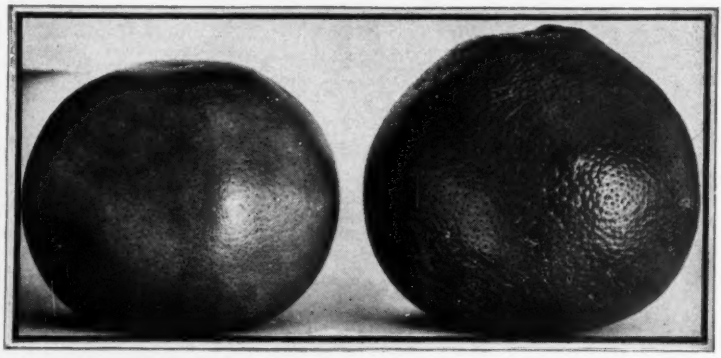
"We sell a lot of it," replied the druggist, "and we've never had a complaint."

"Well, I'll take a bottle," said the bride after a moment, and went out.

In five minutes she was back. She got the druggist into a corner and whispered into his ear—

"I forget to ask about this baby tonic," she said under her breath. "Who takes it—me or my husband?"

# Better Fertilizer *makes* Better Fruit



THE fruit at right was fertilized with ample nitrogen and phosphoric acid, but insufficient potash. Note the improved quality of the fruit at the left which received a balanced fertilizer containing plenty of potash. Better fertilizers are your best insurance of better fruit.

Without sufficient potash, trees are apt to lose their vitality, causing the present set of young fruit to be too small for market. A liberal application of potash builds up the cell structure of wood and fruit through efficient transfer of starch and sugars.

It will pay you to put your trees in condition to profit by the summer rains, by applying a citrus fertilizer containing 10% or more potash. If your spring application consisted solely of nitrogen give your trees 3 to 5 pounds of sulphate of potash as a separate application. Guard against inferior fruit by furnishing your trees with plenty of potash.

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